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POPULAR Computing WEEKLY

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23-29 August 1984

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Vol 3 No 34

Oric writ for Saatchi

ORIC Products International is now involved in a suit and counter-suit with its advertising agency, KMP, a wholly owned subsidiary of Saatchi and Saatchi.

KMP issued a writ against Oric for non-payment of £200,000 owed to the advertising agency. The money had been outstanding since April.

On the day before the case was due to be heard Oric lodged a counter suit, claiming "wrongful advice" from KMP.

"Oric had been legally advised not to pay the debt, and so is putting through a counter suit," said an Oric spokesman.

"As far as we can tell, the object of the counter suit is to delay proceedings until Oric can get time to sort out a deal for payment," said Dick Richards, KMP's finance director.

"Oric has said that we didn't do what it was to pay us to do. But, according to instructions, approved advertising appea-

continued on page 5

Commodore's net in autumn launch

COMPUNET, Commodore's own networking system for owners of its 64 micro is now operational.

At present only a panel of user-group members have access to the system, which will be launched to the public on September 18.

The first Commodore modems should be delivered from next week and purchasers will each receive a free Compunet subscription form.

"Judging from our mailing list of people who have ordered modems, we expect to have about 1,000 subscribers to Compunet by October," said Commodore's Mike Horne.

"We plan to produce a minimum of 20,000 modems by Christmas.

Teleshopping, an estate agency service, full database and free software will all be available initially on Compunet. The joint organisers of the system, Commodore and ADP Network Services, are in negotiation with a high street bank for a home banking facility.

"One of Compunet's stronger features will be the educational software provided," continued Mike. "At the moment, we have fifty good quality educational packages on the system — these will be updated by ten more each month.

"Software vendors have been particularly interested in Compunet because of the security of the programs. The Commodore modem effectively becomes a dongle with Compunet — down-loaded software can only be used when the same modem is connected to the computer."



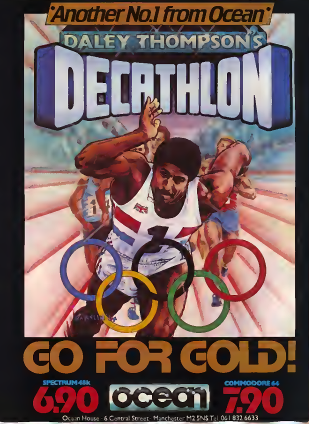
Stranglers quilled

FOUR-MAN rock group The Stranglers, who rose to prominence during the punk music explosion of 1976, are to release an adventure game with their new album *Aural Sculpture*.

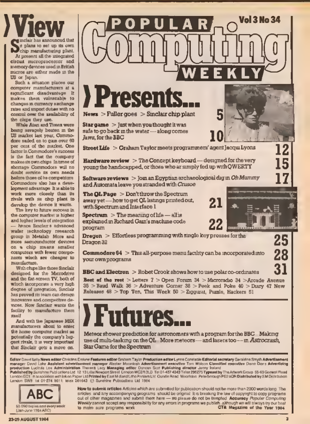
The adventure will be included in the cassette version of the album, although not packaged with the record.

The game, *Aural Quest*, written for the 48K Spectrum using *The Quill* is based on the album's theme. Players must travel the world in search of pieces of the ear, which they must then fit together.





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POPULAR Computing WEEKLY Vol 3 No 34

) View

Sinclair has announced that it plans to set up its own chip manufacturing plant.

At present all the integrated circuit microprocessor and memory devices used in British micros are either made in the US or Japan.

Such a situation places our computer manufacturers at a significant disadvantage. It makes them vulnerable to changes in currency exchange rates and import duties with no control over the availability of the chips they use.

While Atari and Timex were being savagely beaten in the US market last year, Commodore sailed on to gain over 60 per cent of the market. One factor in Commodore's success is the fact that the company makes its own chips. In times of shortage Commodore will no doubt service its own needs before those of its competitors. Commodore also has a development advantage. It is able to work more closely than its rivals with its chip plant to develop the device it wants.

The key to future success in the computer market is higher and higher levels of integration — hence Sinclair's advanced wafer technology research group in Metalab. More and more semiconductor devices on a chip means smaller computers with fewer components which are cheaper to manufacture.

With chips like those Sinclair designed for the Microdrive and the flat-screen TV, both of which incorporate a very high degree of integration, Sinclair has proved its team can design innovative and competitive devices. Now Sinclair wants the facility to manufacture them itself.

And with the Japanese MSX manufacturers about to enter the home computer market as potentially the company's biggest rivals, it is very important that Sinclair gets a move on.

) Presents...

) Futures...

Meteor shower prediction for astronomers with a program for the BBC. Making use of multi-tasking on the QL. More meteors — and lasers too — in *Astrocrash*, Star Game for the Spectrum

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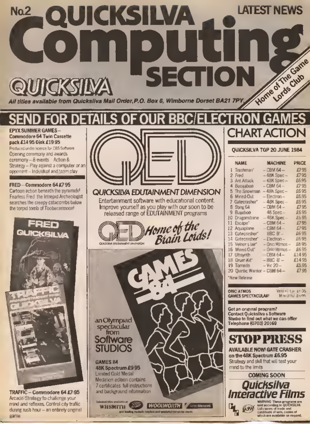
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Chip plant for Sinclair

SINCLAIR Research looks set to move into manufacturing for the first time with plans to build a semiconductor factory in the UK.

The plant is part of Sinclair's fifth generation project, announced by Sir Clive Sinclair two weeks ago

The chips produced using advanced wafer-scale integration techniques will, however, not be for sale on the open market. Instead they will be used by Sinclair Research in new products based on the results of research now being carried out at the company's Metalab in Cambridge. A team at Metalab has been set up to research new semiconductor wafer fabrication and thin-film techniques

The company hopes that the factory will be completed by the time Sinclair's proposed share flotation takes place next year One of the first devices planned to be built by the plant is the 0·5M Ram expansion for the QL.

●The company has also appointed a second distributor for the QL in addition to Prism — Terry Blood Distribution (Computers) — TBD — of Staffordshire, major distributors of records, tapes and videos.

Rabbit debts top £200,000

A STORMY meeting of Rabbit Software creditors on August 10 appointed certified accountant Stuart Andrew Edgar as liquidator

Edgar was nominated by Rabbit shareholders, the creditors putting forward no alternative nomination

The total debts of Rabbit, which went into liquidation three weeks ago, amount to over £220,000 While the company has assets of just over £284 000 it realisable value is put at £182,700 The assets are now in the care of Rosan & Co, of Croydon, Surrey, acting for the sheriff of London.

BBCs for Ireland

ACORN Computer Group is to set up a manufacturing facility for the BBC B micro in the Republic of Ireland.

The company has appointed Lendac Data Systems of Dublin, already sole distributors of the BBC in Ireland, to begin manufacture in September Production of 5,000 units is expected in th first year of operation.

Oric writ

continued from page 1

red in approved media at an approved price."

The case should now be heard in September

Oric has also denied that it may be pulling out of the UK market altogether, as has been suggested "Oric is a UK company and we recognise that we need to maintain a healthy position here for the Atmos and future products," continued its spokesman.

However, 15 redundancies have been made at Oric in the UK, and 15 more staff taken on in Europe The company has also been negotiating to set up a French manufacturing facility

Sanyo MSX prices

SANYO has announced the price of its MSX micro to be launched in this country in the Autumn.

The Sanyo MCP 100, at £299 85 will be £20 more expensive than its main MSX rival, Toshiba's HX10

It has 64K Ram, 32K Rom and 16K video Ram. The MCP100 has a Centronics parallel printer port and at the time of its launch, MJY-01 joysticks at £12.95 and a light pen and cartridge adaptor — the MLP-01 — at £89 95, will also be available

Fuller crash

FULLER, the Spectrum peripherals manufacturer, has gone into receivership

Two weeks ago, the company was declared insolvent at a board meeting, and after the creditors' meeting on Friday, August 24, will go into voluntary liquidation.

Along with Quicksilva, DK'tronics and Kad, Fuller was one of the first companies to produce add-ons for the ZX81.

Ocean goes for Gold

MUCH of the new software available this autumn will be imported from the US

After Sierra and First Star comes US Gold, the company set up jointly by Ocean and Centre Soft.

The company has now signed deals with nine US companies, including Datasoft, Cosmi, Microprose, Bally Midway, Synapse Access and Strategic Simulations to produce games for the Commodore 64 and Spectrum.

Over thirty titles are involved in the first batch of releases including games like *Caverns of Khafka* and *Slinky* from Cosmi, and *Zaxxon* from Synapse, which have previously only been available here on Atari

Games with themes familiar to a UK audience include Datasoft's *Dallas Quest* and *Bruce Lee* titles and *Buck Rogers* and *Star Trek* from Bally Midway

Some of the Commodore titles have already arrived — Cosmi's *Forbidden Forest*, Microprose's *Solo Flight* and Access' *Beachhead* — and the remainder will be released within the next month or so

"The Spectrum versions will be following a month behind," said Ocean's David Ward. "Because we are doing the manufacturing in this country rather than simply importing, we are able to sell at UK prices instead of the $30 these games cost in the States."

David Ward managing director of Ocean

Most of the Comodore titles will be £9 95 and most Spectrum programs will be £7 95. Versions for the Amstrad and MSX machines are also under consideration.

Ocean and Centresoft have between them invested £800,000 in US Gold. Ocean will be mainly responsible for the technical work for the conversions with Centre Soft handling distribution.

Houses shift out of Dragon

SOFTWARE houses which rose to prominence producing material for the Dragon are now — following Dragon's receivership — looking to other machines.

Software and Salamander have both announced Autumn releases, which are mainly conversions from the Dragon to other machines and neither has announced new Dragon titles.

Salamander not in receivership as has been widely rumoured, will be converting the *Dan Diamond* trilogy for the Spectrum and 64 at around £13 00 for the three programs and *737 Flight Simulator* for MSX and the Oric Atmos at £9.95 Its multi-part adventure *Castle Baron*, which the company began work on eighteen months ago is now to be written on the Commodore 64 rather than the Dragon and is now expected to be released in early 1985

However, the company is also setting up a Software Discount Club specifically for Dragon owners who are having difficulty in obtaining Dragon software

Any future releases we do for the Dragon may well be limited to club members by mail order," said Chris Holland of Salamander

Shards will be releasing *The Pettigrew Chronicles* for the Commodore 64 and the Spectrum, a 'compilation' program of the best parts of *Pettigrew's Diary* and *Operation Safras*, according to managing director Steve Maltz. *Empire*, the strategy game, is to be converted for the 64, and *Galilee*, the sequal to *Jericho Road*, is being released for the Spectrum.

Shards looks unlikely to release any new games for the Dragon.

● It has now been confirmed (see *PCW* July 19) that Eurohard SA, of Caceres in the Extra Madura region of Spain, has bought the assets of Dragon Data. Manufacture of the Dragon 32 and 64 will begin in Spain as soon as possible. GEC will handle distribution here.

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Letters

QDOS manual

Way back in January 1984, when the Sinclair QL was launched, there was much said about 'multi-tasking' and the amazing QL operating system — QDOS. Now, seven months after ordering the QL and two months after receiving the machine and its 'User Guide', I have taken delivery of the 'QDOS Manual' at a cost of £13, including postage and packing.

The document Sinclair Research calls the 'QDOS Manual' is, in fact, the missing pages from the QL Users' Guide detailing such mysteries as 'multi-tasking', system variables and QDOS system calls which the advanced programmer would find invaluable.

I ended up with my QDOS Manual by writing polite letters to Sinclair Research asking for the technical data "... I felt I had a right to be supplied with". This resulted in my getting a letter from the Customer Relations Department suggesting that I forward a cheque for £13. Try it — it might work for you. It arrived within a few days — honest!

Once you get your hands on one of the elusive documents, written by Tony Tebby, you will find it has some 150 pages and is written in a highly technical manner.

The first thing I noticed was a secret revealed which has been kept closely guarded by Sinclair. The QL was initially intended as a 32K/128K RAM configuration with an option to upgrade similar to the Spectrum 16K/48K arrangement.

A brief introduction and overview of QDOS starts the manual, closely followed by details of changes to previous versions. My manual documents QDOS Version 1.03 — the earlier ones run through the release numbers 0.05, 0.06, 0.07, 0.08, 1.00, 10.01 and 1.02. In fct, you can find out which version of QDOS you have by looking through the Rom for a string in the format n.nn. My 'AH' version QL has version 1.02 QDOS.

The first half or so of the manual systematically describes each system call to QDOS (via the MC68008 *Trap* instructions) detailing input parameters, output parameters, registers affected and possible error return situations. The subjects covered by these *Traps* are job creation and deletion, job management, resident procedure control, display handling, intel i8049 communication, serial port control, real-time clock control, memory allocation and file handling.

Other chapters are devoted to such subjects as device drivers, Rom drivers, interrupts, arithmetic handling, QL Microdrive format, interfacing to QL SuperBASIC, system variables and example assembly programs.

Details on QL Peripheral expansion are not available until "after the launch of the various devices".

As I said earlier, the manual is not exactly written with the complete beginner in mind — more the advanced proramмer, or hobbyist.

With this said, I have to say the QDOS Manual is everything I wished. Let us not get romantic, though. It is quite obvious this extra information should have been supplied in the first place with the QL — not as an optional extra several months later. I hear this 'multi-tasking' is not implemented on QL versions FB, PM and AH. We will all have to wait for Sinclair to plug in the precious JM version, "within ten working days".

Then, your QDOS Manual will become a QL Bible.

Alan Turnbull
Gale Green
Stockport
Cheshire

A new bug

Ian Logan wants to hear about 'new' Spectrum bugs huh? OK, here's one.

```
1 DEF FN e(n,m)=n+m: DEF FN
f()=FN e(29,FN e(17,8)): REM numbers chosen especially for
HHGTTG fans.
PRINT FN f()
42
```

is the wrong answer. *FN e(n,m)* just calculates the sum of two numbers, *FN f()* should give the sum of 29 plus the sum of 17 and 8 (29+17+8=54), but it doesn't. In fact, the computer has worked out 17+17+8=42.

This is because, although the Spectrum uses a stack to keep track of the order of functions (ie, it must perform *Fn e*(17,8) before *Fn e*(29 ...) it holds the numbers it works with, its operands, in fixed locations. This means that the 29 and the 17 will occupy exactly the same areas of memory because they are both the first operand of an *Fn* e. Since the 17 is interpreted after the 29, it just replaces it before the computer has had a chance to do anything with the 29.

So the computer ends up evaluating *Fn* e (17,17+8).

Julian Skidmore
25 Cossall Road
Trowell
Notts

Evil and sinister

Firstly, congratulations on the improvements to *Popular Computing Weekly*. It was always the leading magazine, but is now even better (perhaps with the exception of the unamusing advertisement from Automata).

Anyway I digress from the main point, which is to point out my extreme displeasure at receiving inside PCW this week a leaflet advertising a Dianetics publication. You cannot fail to have read a High Court Judge's recent comments about the Scientologists — the group behind Dianetics — whose activities parallel those of the Unification 'Church' (Moonies).

The Judge described Scientology as "Evil" and "Sinister", and by allowing Scientology a place in your publication, you may have unwittingly lined up some reader or readers for a particularly nasty experience.

H Petfield
6 Cranley Gardens
Wallington
Surrey

The magazine will not be taking any more Scientology ads.

Vic20 modulator

It was interesting to read Phil Rogar's reply to P Whalley in *Peek & Poke* in the July 19 issue on the question of faulty Vic20 modulators.

A 'faulty' Vic modulator is often caused by users and not by the Black Box itself. Many people (quite possibly Mr Whalley not included) remove the modulator from the Vic by tugging at the cable between the modulator and the machine, and not by the recommended method of holding the actual connecting plug. Constant tugging wrenches the leads inside the connector out of position causing loss of sound or picture, or both.

M J Dawes
The Waverley
79 Rhosmaen Street
Llandeilo
Dyfed

Stop bickering!

I would just like to point out to Mr Bathurst (August 9 issue), that, while the Commodore 64 has only 38K for Basic programming it has another 18K which can be used either for machine code, or for storing graphic or sound detail.

I also object to letters like that of Mr Haighley (same issue), which, while it has a point to make — that magazines do not print enough for the Electron (I agree, but can't the Electron use BBC software?) the writer also decides to slip in a quick slagging-off of the Commodore 64.

Well, I own a TZQPA 3200042K computer with built-in speech synthesiser, instant retrieval disc drive, TV resolution graphics, and it's better than all the other computers put together, so stop bickering!

M Valenons
101A Underdale Road
Shrewsbury


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Jaws

Just when you thought it was safe to go back to your computer . . . *Jaws* for BBC B by Robert Hedden

In this program for the BBC B you are a diver trying to retrieve golden treasure chests from the sea-bed and put them in your blue boat

If you touch any of the harmless red fish, they become frightened and a shark is alerted which chases you until you are safely inside the boat.

As you progress, the shark moves faster and the red fish get closer together. Naturally, you swim more slowly when carrying the heavy chests.

Lines

30 - 58	Set up envelope variables user-defined characters at graphics cursor (VDU5)
110 120	Draw sea floor and surface using back ground fill (plot 77)
180 170	Main loop moves diver stopped by meeting non-background colour
210 280	Clear screen for shark. Chase until non-background colour. Repeat or die
ProcM	Draw diver at B%, A%
ProcS	Draw shark: move closer to diver
Proc I	Check for key-press, change diver's co-ordinates; draw diver
386 400	End game high score, restart
ProcFISH	Clear screen window: draw flashing fish with random spacing
ProcPICK	Adjust screen and score when treasure ground up
ProcNEWP	Draw new treasure and fish
ProcSCORE	Adjust score with fanfare
Proc1	Set faster flash rate

Variables

B% A%	Diver's co-ordinate
C% D%	Shark's co-ordinate
I%	Score
F% W%, X%	
Y%, Z%	Control loop variables
N%	Speed of shark
M%	Speed of diver
P%	Position of treasure
PC	Flag for treasure

```
   10REM *** JAWS ***
   20REM *** By R.D.M.Hadden 1984 ***
   30MODE2:HS=5:N$=""
   40PROCINTRO
   50REM *** INITIALISE ***
   60B%=450:A%=990:M%=20:T%=-10:PC=0:N%=26:H=40:VDU5
   70ENVELOPE1,128,0,-2,2,25,25,25,0,0,0,-126,126,0:ENVELOPE2,10,4,-8,0,4,1,1,0,
0,0,-126,126,0
   80GCOL0,134:GCOL0,9:CLG:COLOUR130:COLOUR4
   90VDU23,250,0,0,1,59,126,126,59,1,0,23,251,16,57,127,255,63,125,56,0,23,252,24,
24,74,60,24,24,36,36,23,253,0,112,248,248,248,248,248,248
  100REM*** DRAW ***
  110GCOL0,2:MOVE0,90:DRAW1279,90:FORF%=90TO0STEP-4:PLOT77,S%,F%:NEXT:COLOUR130:
VDU4:PRINTTAB(0,30)"Score"TAB(0,31)"HS-";N$;" ";HS;:VDU5
  120GCOL0,4:MOVE300,980:PRINT"\__/":FORF%=976TO952STEP-4:PLOT77,400,F%:NEXT
  130GCOL3,6:PROCM
  140REM*** MAIN PROG ***
  150REPEAT
  160PROCI
  170UNTILPOINT(B%+32,A%-16)
  180IFPOINT(B%+32,A%-16)=5 PROCPICK:GOTO150
  190IFPOINT(B%+32,A%-16)=2 PROCNEWP:GOTO150
  200REM*** SHARK ***
  210COLOUR134:VDU4,28,0,23,19,3:CLS:VDU5,26:COLOUR130:MOVEB%,A%:VDU252
  220N%=N%+2:C%=1250*(RND(2)-1):D%=200+RND(800):MOVEC%,D%:VDU251:SOUND2,2,20,-1
  230REPEAT:PROCI:PROCS:UNTILPOINT(B%+32,A%-16):*FX21,6
  240IFPOINT(B%+32,A%-16)<>2 GOTO380ELSEGCOL3,6:MOVEC%,D%:VDU251
  250IFPC PROCFISH:GCOL3,6
  260GOTO150
  270REM ***DRAW MAN***
  280DEFPROCM:MOVEB%,A%:VDU252:ENDPROC
  290REM*** SHARK ***
  300DEFPROCS:MOVEC%,D%:VDU251:C%=C%-N%*(B%>C%)+N%*(B%<C%):D%=D%-N%*(A%>D%)+N%*(
A%<D%)+N%*(D%>950):MOVEC%,D%:VDU251:ENDPROC
  310DEFPROCI:IFINKEY(-103) PROCM:B%=B%+M%*(B%>M%):PROCM
  320IFINKEY(-104) PROCM:B%=B%-M%*(B%<1220):PROCM
  330IFINKEY(-66) PROCM:A%=A%-M%*(A%<990):PROCM
  340IFINKEY(-98) PROCM:A%=A%+M%*(A%>109+M%):PROCM
  360ENDPROC
  370REM *** END ***
  380VDU4:PRINTTAB(0,25)"YOU HAVE BEEN EATEN.":*FX21,0
  390IFT%>=HS PRINT "HIGH SCORE":INPUT"Name ",N$:HS=T%
  400IFGET$<>" " GOTO400ELSEGOTO60
  410DEFPROCFISH:COLOUR134:VDU4,28,0,23,19,3:CLS:VDU5,26:COLOUR130
  420FORY%=500TO700STEP200:X%=1300:Z%=Y%:REPEAT:FORW%=9TO14STEP5:GCOL0,W%:X%=X%-
RND(H)-45:Z%=Z%-25+RND(50):MOVEX%,Z%:VDU250:NEXT:UNTILX%<=0:NEXT:ENDPROC
  430DEFPROCPICK:MOVEB%,A%:VDU252:MOVEP%,122:GCOL0,6:VDU253:GCOL3,6:PC=0:MOVEB%,
A%:VDU252:SC%=5:PROCSCORE:M%=M%-10:ENDPROC
  440DEFPROCNEWP:IFPC ENDPROC ELSEPC=1:H=INT(H*.8):SC%=10:PROCSCORE:IFH<20 PROC1
  450PROCFISH:GCOL0,3:P%=RND(800)+200:MOVEP%,122:VDU253:M%=M%+10:GCOL3,6:ENDPROC
  460DEFPROCSCORE:T%=T%+SC%:VDU4:PRINTTAB(5,30)T%;:VDU5:SOUND1,1,100,20:ENDPROC
  470DEFPROC1:*FX9,20
  480*FX10,20
  490ENDPROC
  500DEFPROCINTRO
  510COLOUR134:CLS:COLOUR1:PRINTTAB(8,5)"JAWS"''TAB(2)"By R.Hadden 1984";COLOUR4
:PRINTTAB(0,15)"A - up" "Z - down" "< - left" "> - right"  "space - start"
  520PRINTTAB(0,25)"Carry treasure to   boat and avoid fish which warn maneating
shark when scared."
  530IFGET ENDPROC
```



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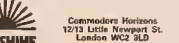


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Software secret agent

***Graham Taylor** talks to software programmers' agent, Jacqui Lyons*

There was a time about a year ago when it seemed that the only teenage males not being signed to flamboyant Liverpool software houses were those too busy appearing on Top of the Pops

For every one that made enough money to buy all the hi fi's, walkmen, compact discs, videos and bigger and better computers, he could ever require, there were countless others who received little or nothing and felt bitter and cheated

It was a peculiar situation, a lack of managerial, organisational and, above all, legal experience on the part of everyone involved — particularly the programmers who, like so many teenybop stars before them, seldom understood what they were signing Of course, this is the more generous explanation of what occured, there is another many of the people involved were crooks

It really needed a professional person whose job it was to look after the programmers interest.

One of the most successful of these software agents is Jacqui Lyons whose company Marjaq Scripts is jointly run with co-director George Markstein — best known for his work on *The Prisoner* and other TV programs

"To begin with I had no idea about how to contact software programmers," said Jacqui "I first tried a tentative ad in a computer magazine — I got virtually no response from programmers at all, but I was inundated by publishers looking for computer book authors, so I knew it was an area worth pursuing

"The small software houses where it's one man in his house selling games and paying royalties are and were, from last year, going out of business The big companies are taking over and they need proper negotiated contracts, agreed time limits, specific programming requirements and the rest.

Equally the programmers find they are dealing with big international companies and they need support in getting the right deal."

Jacqui takes on people rather than products — a concept that some programmers have found surprising "My work is not primarily concerned with introducing people to one another and organising contracts — I spend a lot of time getting the programs right. I tend to look after things like graphics and spelling which is usually quite appalling "

Programmers are often their own worst enemy "They are sometimes very badly equipped for interaction with other humans — they are frequently very tongue-tied — you wouldn't believe the number of incomprehensible messages I get on my Ansa phone Half the time I can ring them back to find out what they want because they forget to leave their names and addresses "



Jacqui has built a team of programmers "about 25 — I wouldn't want to deal with more than " — who do work to order "We've been involved with companies such as Century, Mosaic, Cheetah and Island Logic who have been especially set up for computer software, but the more conventional publishers are getting involved too I'm often talking to the same people I used to talk to when I was dealing solely in books."

The computer/book package where a computer game, often an adventure, contains themes from a well known book is obviously an area particularly appropriate to Jacqui's set up

I point out that the initial offerings in the book/software area have been lame to say the least "That's true and it really reflects the fact that although the book companies were quick to spot the trend — they'd seen what happened with computer books after all — they didn't know how to go about it. For example, one company insisted that all the programs be written in Basic so that they would be easy to transfer from one machine to another — obviously the end result was just far too unsophisticated "

Jacqui and her team have been working on the first major software release from Century Communications — the recently set up software side of Century Publishing To be called *Legend*, the program is a text adventure with arcade sequences "It's based around a book and Century commissioned us to develop the gameplay "

After book publishers the next people to move into computer publishing are the independent TV companies Aside from Thames' expected deal with DK 'Tronics to produce software based on some of its better known programs, other companies such as Granada are known to be keen.

"At the moment I think some of the TV people are in very much the same position as the book publishing houses were until recently — that is they don't really know what they want and have little idea about computers and what make a good game.

As much as anything else, the development of a role as sophisticated as that of Jacqui's reflects how the industry has changed over the past year The distinction between the programmers and the promoters and marketers of the product is growing wider — the last few one-man bands are quietly going out of business.

As Jacqui says "now it's thousands invested, months of development, marketing strategies and the rest; it involves teams of programmers, proper contracts, and strict schedules It also means discovering who has the rights to what and whether those rights include electronic media rights; in short it's getting very complicated."



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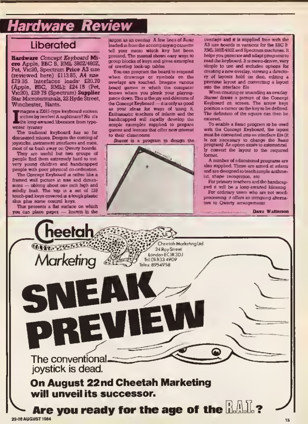
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Hardware Review

Liberated

Hardware *Concept Keyboard* **Micro** Apple, BBC B, RML 380Z/480Z, Pet, Vic20, Spectrum **Price** A3 size (reviewed here) £113.85, A4 size £79.35 Interfaces leads: £20.70 (Apple, BBC, RML); £24.15 (Pet, Vic20), £29.75 (Spectrum) **Supplier** Star Microterminals, 22 Hyde Street, Winchester, Hants.

Imagine a ZX81-type keyboard sixteen inches by twelve! A nightmare? No it's the long-awaited liberation from typewriter tyranny

The tradional keyboard has so far dominated micros. Despite the coming of joysticks, instrument interfaces and mice, most of us bash away on Qwerty boards.

They are useful but two groups of people find them extremely hard to use very young children and handicapped people with poor physical co-ordination.

The Concept Keyboard is rather like a framed wall picture in size and dimensions — oblong about one inch high and solidly built. The top is a set of 128 touch-pad keys covered in a tough plastic skin plus some control keys.

This presents a flat surface on which you can place paper — known in the jargon as an overlay A few lines of *Basic* loaded in from the accompanying cassette tell your micro which key has been pressed. The manual shows easy ways to group blocks of keys and gives examples of creating look-up tables

You can program the board to respond when drawings or symbols on the overlays are touched. Imagine various board games in which the computer knows where you plonk your playing-piece down. This is the joy and dilemma of the Concept Keyboard — it is only as good as your ideas for ways of using it. Enthusiastic teachers of infants and the handicapped will rapidly develop the simple examples supplied to prepare games and lessons that offer new interest to their classrooms

Starset is a program to design the overlays and it is supplied free with the A3 size boards in versions for the BBC B RML 380Z/480Z and Spectrum machines. It helps you generate and adapt programs to read the keyboard. It is menu-driven, very simple to use and includes options for creating a new overlay, viewing a directory of layouts held on disc, editing a previous layout and converting a layout into the interface file

When creating or amending an overlay *Starset* draws a picture of the Concept Keyboard on screen. The arrow keys position a cursor on the key to be defined. The definition of the square can then be entered.

To enable a Basic program to be used with the Concept Keyboard, the layout must be converted into an interface file (it is not necessary to change the Basic program) An option exists to automatically convert the layout to the required format.

A number of educational programs are also supplied. These are aimed at infants and are designed to teach simple arithmetic, shape recognition, etc

For primary teachers and the handicapped it will be a long-awaited blessing

For ordinary users who are not word-processing it offers an intriguing alternative to Qwerty arrangements

Dave Watterson

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THE KEYBOARD

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MTX

SERIES

Snowball

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Lords of Time

Colossal Adventure

Dungeon Adventure

A fair copy

Program *Dune Rider* **Micro** BBC **Price** £7.95 **Supplier** Micro Power, Northwood House, North Street, Leeds LS7 2AA.

One of the fundamental laws of home micros is that three months after the Commodore and Spectrum get a game the BBC will get a version of it (usually with less features)

Such is the case with *Dune Rider* which is a version of *Moon Buggy*

True to the original you have to trundle over the planet surface blasting backwards, forwards and upwards at the usual attacking aliens and jump over various rocks and pits which block your path.

If you liked the original then this is a fair copy — the graphics are quite small but you can blast away quite happily.

Ian Waltham

A grade above

Program *Block-Buster* **Price** £5.95 **Micro** Spectrum **Supplier** Compusound, 32 Langley Close, Redditch, Worcs.

This program is a direct copy of the TV game of the same name and is well done. The hexagonal parts of the Block-Buster board are cleverly made up on the Spectrum's none-too-flexible display Colour and sound are used to the full and the game works well, allowing either a two player game or a player v computer game The latter isn't easy, the computer often interrupting itself in the middle of a question to supply the answer Unfair? No, because it's not very clever and as likely as not to get the answer wrong!

The strength or weakness of any game like this will be in the questions asked, and fortunately there is a good selection of questions at varying levels of difficulty (But don't believe the blurb on the box level 1 questions are the hardest not the easiest!) What does put this game a grade above others is that it allows for new questions to be loaded in from tape, thus catching out those who have played before I can see an industry in question tapes developing, too, once people work out the structure of the array they are in.

Of all the games around for the Spectrum, this one must be more educational than most, and is at a level to attract those who, like most of us, find that they get wiped off the board when playing the computer at *Scrabble*

Simon Springett

Curate's egg

Program *Paint Pic* **Price** £12.95 **Micro** Commodore 64 **Supplier** Kuma Computers Ltd, Unit 12, Horseshoe Park, Horseshoe Road, Pangbourne, Berks RG8 7JW

This program is a multi-colour high resolution graphics utility from Kiwisoft, a New Zealand software house, and it is very much like the proverbial curate's egg — good in parts

The specification is excellent — it provides a complete set of commands for drawing, colouring and saving multi-colour hi-res pictures For example, there are many pre-defined shapes available, commands to control the definition and use of complex textures, blocks of the picture can be manipulated, and there's a facility to help perspective drawing Additionally, there is a set of help screens if you forget any of the commands.

Unfortunately, this is where *Paint Pic* starts to be less impressive The commands are pretty forgettable on the whole, only a few are at all useful. Furthermore, the help screens are very badly laid out; you have to scan through closely packed text to find the required information.

This would not be a problem if the manual was clear and concise However, it isn't. It is written as a rather wordy tutorial, which is all right when you first use the program but it subsequently becomes increasingly frustrating to use because it is almost impossible to find anything quickly

This is a great pity, because the facilities provided are very powerful, and an otherwise very good product is let down by poor presentation

Richard Corfield

Word checker

Program *Stylograph/Mail Merge/Spell Check* **Micro** Dragon 64 with disc drive **Price** £79.95 (OS9 disc is further £39.95) **Supplier** GEC/Dragon.

Stylograph is the Dragon OS9 package of wordprocessor, addressing and spelling-checker Once the OS9 disc is booted, *Stylograph* can be loaded.

The word-processor supports all the usual functions — full screen editing of text, side-scroll to accommodate long lines, full left and right formatted text, automatic paging with definable headers and footers to each page, centering of text, automatic paragraphing and so on.

All of the formatting commands are entered as the first item on a line and are preceeded by a comma, and all are dynamic, that is, their effect is immediately visible Typing *Ctrl — F* (holding down *Clear* and pressing *F*) will show the text as it will be printed — hiding the formatting commands.

On the same *Stylograph* disc is another program, called *Mail Merge* This will take a number of disc files and print them out as one document — one file can even finish in mid-sentence as long as the next continues from there *Mail Merge* can also take a file of data and print multiple copies of a document inserting data where required.

The third program of this disc is *Spell Check*. This will check a text file prepared by *Stylograph* against a dictionary held on disc Any words not found are displayed and you have the option of ignoring them, changing them, adding them or adding them to a supplementary dictionary

Brian Cadge

Stranded

Program *Crusoe* **Price** £6.00 **Micro** Spectrum **Supplier** Automata UK, 27 Highland Road, Portsmouth, Hants.

Here is an adventure program that could be a big hit in the next few months. *Crusoe* puts you on a desert island armed only with your wits and some hints on the cassette box. The game never takes itself seriously, and the setting is a refreshing change from the ghoulies and ghosties that most programmers' imaginations are limited to.

You are shown a map with Crusoe himself and various dangers and objects marked out, and as you get to the edge of the screen the map moves along to show the next section of the island. Reports about what is going on are displayed, and you then decide what Crusoe will do. The vocabulary is large and the replies witty. The game seemed to work as it should, though entering "6" had dire results, and I was never sure why. Crusoe is intelligent: He won't, for example, try to walk on water and then drown, rather he informs you that he needs to get his swimming gear on. The *HELP* function is minimal, and I never did discover just how I got untangled from the cactus — but it was edible, which is more than can be said for all the fruit I found.

The game uses colour, graphics and sound well, offering good value and (given Crusoe's tough nature) many hours of sometimes frustrating fun. I'd recommend it!

Simon Sprigett

Man or mouse?

Program *Bongo* **Price** £6.95 **Micro** Commodore 64 **Supplier** Anirog Software, 29 West Hill, Dartford, Kent

A popular theme for arcade games is collecting objects from a cave or chamber that you make your way around by means of platforms and ladders, while avoiding some kind of monster in the cave. *Bongo* from Anirog Software uses exactly this theme.

The story behind the game is that the king (of nowhere in particular) has promised his daughter's hand in marriage to any man who recovers some stolen diamonds. Bongo, the super mouse, decides to have a crack at the challenge. The diamonds have been hidden in some underground caves which are protected by the inevitable monsters. The caves also contain the equally inevitable platforms, ladders and chutes. To marry the princess, Bongo must collect all the diamonds.

Whether the princess is very keen on having to marry a mouse (even if he is a super mouse) if Bongo ever succeeds in getting all the jewels is another matter. However, it may never come to that because the monsters are very effective in protecting the diamonds.

So, although not very original, the game is actually quite good fun, and is certainly quite challenging. But there are plenty of other games like that on the market, many of them better than this one.

Richard Corfield

Frustration

Program *Gems of Stradus* **Micro** Amstrad CPC 464 **Price** £7.95 **Supplier** Kuma Computers Unit 12, Horseshoe Park, Pangbourne, Berkshire.

Gems of Stradus follows the usual adventure format: overcome the hazards and find the treasure using the objects which you find lying around while in your travels.

This is a graphic adventure but since it is set in a maze all the pictures, which fill a quarter of the screen, look remarkably similar and are really only useful for spotting exits. The hazards, creatures and objects that you discover are all illustrated and are the best part of the graphics.

Moving is at first very confusing because the cursor keys are used in a forward, back, left and right system — which results in rapid disorientation followed by frustration at getting lost so easily.

If you can master the movement, though, the adventure should be not insurmountably difficult to solve and therefore quite fun to play. If you do get stuck the *Help* facility gives clues that are as subtle as a brick!

More descriptive text would have improved the atmosphere and I would say that, unless you are really desparate for an adventure, I'd give this one a miss.

A maze is pretty boring compared to enchanted castles, sinister space ships and deserted mines.

Greg Pearson

Self-taught

Program *The Complete Machine Code Tutor* **Price** £9.95 **Micro** Commodore 64 **Supplier** New Generation Software Ltd, Bath, Avon.

Many home micro owners sooner or later become frustrated with the limitations of Basic, and turn to the possibilities of using machine code. However, the problem then arises of how to learn it.

One approach is to use a cassette based self-study course, and *The Complete Machine Code Tutor* from New Generation Software is one such course. It comes on two cassettes supplemented with a small manual.

The course is divided up into 24 lessons, each one describing a particular concept or group of instructions. Many lessons are followed by exercises containing some sample programs illustrating the content of the preceding lesson. The text is clear and concise, and the exercises are generally useful.

One very good feature is the 6502 simulator. This enables you to run the sample programs, or ones of your own, one instruction at a time, while displaying helpful comments and the contents of the registers and flags.

However, there is more to writing machine code than merely knowing what each instruction does, and this course does not go beyond the basics. As such it is a good introduction to machine code, but a good book would probably do just as well.

Richard Corfield



Rolling tyres

Program *Automania* **Price** £5.95 **Micro** Spectrum **Supplier** Mikro-Gen, 1 Devonshire Cottages, London Road Bracknell, Berks

Arcade game fans roll up and buy this game here are all the ingredients of a big success, with only a few small niggles to spoil the fun. The game took about five minutes to load from tape a wasted five minutes in my case as it is incompatible with Interface 1 and the computer reset after loading. Switch off, unscrew Interface 1 and try again. This time, no problem.

Once the game is up and running, it rolls a selection of credits up the screen, study these carefully, some of the jokes are quite good. Sound is used well, and it's not their fault that the Spectrum speaker is so feeble you can hardly hear it (They allow you to turn it off, but you may not notice any difference!)

Colour is exploited to the full and the graphics are excellent: faintly reminiscent of *Jet Pac*. I had no instructions with my tape, so it took a while to work out what to do but after studying the demo mode it became clear that the aim is to assemble a car in the Automania workshop, all the while avoiding falling tools, etc

Should be a winner, and well worth the money if you are a games player. It should be made compatible with Interface 1, though, or microdrive owners may be put off by the inconvenience of removing what is designed to be a semi-permanent attachment.

Simon Springett

Mamo mia

Program *Oh Mummy* **Micro** Amstrad CPC 464 **Price** £7.95 **Supplier** Amsoft, Brentwood House, 169 Kings Road, Brentwood, Essex.

In *Oh Mummy* you play the role of an eminent archaeologist — dressed in flat cap, overalls and boots — leading a team of four in a quest to recover five royal mummies and as much treasure as possible from some Egyptian pyramids.

Everywhere you go — moving using either keyboard or joystick — you leave a trail of footprints. The passageways on the five levels of each pyramid are already clear and all you have to do is excavate the 20 rooms on each floor by walking all round the room. Unfortunately there are two guardian mummies on each floor, one loose and one in an unknown room. These mummies chase you until you discover the key that allows you to move to the next floor. If you manage to dig up a magic scroll you can survive one mummy attack.

You can if you wish vary the speed and difficulty of play as well as switch on or off the sound effects and background music.

In fact, this is not a bad arcade game, based loosely on *Amidar* with good cartoon-style graphics and sound

Greg Pearson

Cold comfort

Program *Pengo* **Micro** BBC **Price** £7.76 **Supplier** Watford Electronics, 33-33 Cardiff Road, Watford, Herts

Pengo is yet another version of that arcade game where you slide blocks of ice around whose title I can never remember. Ancient on the Spectrum and Commodore, it's even oldish on the BBC

You are a penguin and the screen consists of you, square blocks of ice and a collection of blob monsters. Your only means of defeating the blob monsters is to slide the blocks of ice towards them.

Pengo can only move a block of ice if it has a clear path, ie, doesn't have blocks next to it, so half the time your hapless bird has to 'melt' blocks to free a passage for them and thereby splatter the jelly things

This is a good enough version of the game although on later screens all that happens is the number of monsters increase. Other features include a boundary which can send electric shocks and special cubes that do strange things as you put them in a line

It's OK as a game but definitely too expensive

Ian Waltham

Performing ant

Program *Turtle Jump* **Price** £6.99 **Micro** Commodore 64 **Supplier** Romik Software 272 Argyll Avenue, Slough, Berks.

Turtles have featured in a number of recent arcade games — *Turtle Jump* from Romik Software is one of the latest. In this one you have to guide Ekim, a highly trained giant ant (oh really – whatever next), around a small group of islands by hitching a ride on the backs of passing turtles. The objective is to collect as much treasure from a chest full of gold as you can while the lid of the chest is open, and then return Ekim to his home on another of the islands.

You must get out of the treasure chest before the lid shuts or you will be trapped inside and lose one of your lives. You must also look out for the crocodiles, because when one appears all the turtles dive for cover, and if you are standing on one at the time you drown.

The game is well presented with nice graphics and title screen and is really quite tricky. It is very difficult to land on the moving turtles and to stay on board as they float around, However, it soon becomes rather repetitive, and it is not really all that absorbing or exciting

Richard Corfield

Quantum mechanics

***B Cornhill** shows how to get QL program listings on a ZX printer using a Spectrum and Interface 1*

If like me you have up-graded to a QL from a Spectrum with Interface 1 and ZX Printer then this program may be of interest.

Using the Serial 1 port on the QL and the RS232 port on the Spectrum, it is possible to get listings of your QL programs printed out on the ZX Printer

Firstly you will need to wire up a nine-way plug that fits into the Interface 1 socket to the 'printer-end' of Sinclair's QL printer cable. You will first have to take off the existing RS232 plug by carefully unsoldering the six wires Then resolder the printer lead wires to the nine-way plug according to the diagram.

After you have made up the lead, plug the one end into the *Ser1* socket on the QL and the other into the RS232 socket on the Spectrum Interface 1

Then enter the following program into the Spectrum and *Run* it (I used baud 600 for no particular reason).

```
10 FORMAT"t";600
30 OPEN#4"t"
25 LET A$=INKEY$#4
28 IF CODE A$=13 THEN LET
   A$=CHR$ 13:GOTO 30
27 IF CODE A$< 32 THEN GOTO 26
30 LPRINT A$;
40 GOTO 26
```

5 4 3 2 1

5 8 7 6

Wire from QL		Pin No on 9-way socket	
Ground	Black	7	Ground
TXD IN	White	3	Rxd Out
Rxd Out	Green	2	Txd In
Dtr In	Blue	5	Cts Out
Cts Out	Red	4	Dtr In
	Orange	Omit	

Now Load the listing you want to print out into the QL, and enter the following on the QL as direct commands

```
BAUD 600
OPEN#6, SER1
LIST#6
```

Lo and behold, the ZX printer will spring into life and produce your QL listing

Life, the universe and everything

A very sophisticated machine-code version of the classic game, Life by **Richard Gain**

Many versions of *Life* have been written since the rules of the game were first published in Scientific American in 1970. However, most of them suffer from one serious limitation, the playing area is far too small for all but the simplest patterns. The *Horizons* tape supplied free with every Spectrum includes a fast and colourful version, but with a grid of only 32 by 22 cells.

With the recent publication of *Wheels, Life and Other Mathematical Amusements* by Martin Gardner, a catalogue of new and old life-forms has become available for experimentation and all that is required now is a fast version of *Life* with as large a playing area as possible, hence the program below.

In case anyone has not come across the rules before, they are explained simply as follows:

1) Each cell on the grid has eight surrounding squares which determine the birth, survival or death of the cell in the next generation.

2) Any live cell with two or three live neighbours will survive to the next generation, otherwise it will die of isolation or overcrowding.

3) Any empty cell with exactly three live neighbours will become occupied in the next generation, ie, a birth.

This version runs on a grid of 160 x 160 cells each represented by one pixel. First type in the main program shown in Listing 1, then save onto tape with *Save "Life" LINE* 100. After verifying leave the tape in position and *New*. Now type in the Basic program in Listing 2 and *Run* it.

In response to the address prompts, enter the decimal bytes as shown until the program stops with the *OK* report. Next save the code on tape immediately following the Basic program, by typing *Save "Code" CODE* 23296, 230. Now rewind the tape and type *"Load"*. Playing the tape should now result in the loading of both parts of the program and the screen will then show a pattern on a white square which changes about once every second. Now just watch as some beautiful Life patterns emerge.

The Basic program consists of two main parts. Line 100 onwards is the initialisation routine and includes the pattern drawer beginning at Line 200. Any combination of *Plot* and *Draw* statements may be placed at Line 200 but these should always end with Line 500 *Goto* 20. This is the start of the main program loop.

Line 20 moves a copy of the screen pattern up to an area in high memory, simultaneously reordering the screen lines by using a version of the *Copy* routine in Rom. Line 40 is then repeatedly called to calculate and redraw the subsequent generations. Do not use *Break* to stop the program as this may have unpredictable effects. Instead, simply press any key which will cause a *Stop* in Line 40. The pattern may now be altered or added to with *Plot* and *Draw*, and then restarted with *Goto 20*.

Because of the large amount of memory taken up by the machine-code whilst running, there is a limit on the number of lines which may be added after Line 200. (The system variable *E-Line* should not be allowed to go above 24578.) More complicated patterns may be designed and saved with a drawing program like *Melbourne Draw*. Line 200 should then be simply *Load "" SCREEN$*.

NB The machine code resides in the printer buffer and any attempt to use the printer will erase it.

The assembly listing was produced on *Gens 3* from Hisoft's *Devpac* and includes calculated expressions. This is to allow any square array of side 8 to 160 (multiples of 8 only) to be set up by simply altering the value in line 180 before assembly. Smaller arrays give faster generation times, up to 5 or 6 per second for 64 x 64 cells.

Listing 1

```
10 GO TO 110
20 RANDOMIZE USR 23328
30 PRINT AT 0,20; INVERSE 1;GE
N: LET GEN=GEN+1
40 RANDOMIZE USR 23330: IF INK
EY$<>"" THEN STOP
50 GO TO 30
100 LOAD ""CODE
110 LET GEN=1
120 BORDER 0: CLS : PRINT [redacted]
[redacted]
OR n=2 TO 21: PRINT AT n,0; [redacted]
[redacted] AT n,28; [redacted] NEXT n
200 PLOT 48,0: DRAW 159,159
210 PLOT 48,159: DRAW 159,-159
500 GO TO 20
```

Listing 2

```
100 FOR n=23296 TO 23296+230
110 INPUT (n),a
120 PRINT n,a
130 POKE n,a
140 NEXT n

23296     0    0    0    128  0
23301     0    0    0    0    0
23306     0    0    0    0    0
23311     0    0    0    128  128
23316     0    0    0    0    0
23321     0    0    0    0    205
23326     174  130  201  0    243
23331     33   255  95   54   0
23336     17   0    95   1    192
23341     192  237  176  33   182
23346     95   17   6    202  6
23351     160  197  35   6    20
23356     197  8    5    28   7
23361     42   27   63   229  213
23366     17   184  0    203  238
23371     43   82   237  82   82
23376     35   82   35   82   25
23381     82   25   82   43   82
23386     45   82   209  225  35
23391     16   223  193  19   16
23396     210  35   236  1    12
23401     0    9    235  193  16
23406     201  33   6    202  17
23411     182  95   6    160  197
23416     19   6    20   197  229
23421     35   91   175  0    0
23426     79   28   111  121  182
23431     7    18   16   247  225
23436     110  35   193  16   234
23441     19   1    12   0    0
23446     193  16   222  200  216
23451     136  201  201  17   0
23456     200  6    192  33   0
23461     64   229  197  1    32
23466     6    237  176  193  225
23471     35   184  230  7    35
23476     16   185  185  32   111
23481     63   159  230  240  132
23486     103  16   209  201  17
23491     0    84   0    192  33
23496     0    200  229  197  1
23501     32   0    237  176  193
23506     225  35   184  230  7
23511     32   16   125  195  32
23516     111  63   159  230  240
23521     132  103  16   229  201
23526     0    0    0    0    0
23531     0    0    0    0    0
23536     0    0    0    0    0
23541     0    0    0    0    0
```

```
*HISOFT GENS3 ASSEMBLER*
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Pass 1 errors  00

                    10 *D-
        20 *C-
        30 ;A high-res fast
        40 ; life routine
        50
5B00    60              ORG  23296
5B00    70              DEFB 0,0,0,198,
0
5B05    80              DEFB 0,0,0,0,0
5B0A    90              DEFB 0,0,0,0,0
5B0F   100              DEFB 0,0,0,128,
128
5B14   110              DEFB 0,0,0,0,0
       120
5B1D   130              ORG  23325
5B1D   140              CALL SWUP
5B20   150              RET
       160
5B22   170              ORG  23330
00A0   180 SIDE         EQU  160
000A   185 PART         EQU  SIDE/16
0AEA   190 CENT         EQU  SIDE*18+PA
RT
00A2   200 SIZE         EQU  SIDE+2
6584   210 GRID         EQU  SIZE*SIZE
0014   220 WIDE         EQU  SIDE/8
       230
5B22   240              DI
5B23   250              LD   HL,24576
5B26   260              LD   (HL),0
5B28   270              LD   DE,24576
5B2B   280              LD   BC,GRID
5B2E   290              LDIR
5B30   300              LD   HL,24576+S
IZE
5B33   310              LD   DE,54288-C
ENT
5B36   320              LD   B,SIDE
5B38   330 LINE         PUSH BC
5B39   340              INC  HL
5B3A   350              LD   B,WIDE
5B3C   360 BYTE         PUSH BC
5B3D   370              LD   B,8
5B3F   380              LD   A,(DE)
5B40   390 BIT          RLCA
5B41   400              JR   NC,EMPTY
5B43   410              CCF
5B44   420              PUSH HL
5B45   430              PUSH DE
5B46   440              LD   DE,SIZE
5B49   450              SET  4,(HL)
5B4B   460              DEC  HL
5B4C   470              INC  (HL)
5B4D   480              SBC  HL,DE
5B4F   490              INC  (HL)
5B50   500              INC  HL
5B51   510              INC  (HL)
5B52   520              INC  HL
5B53   530              INC  (HL)
5B54   540              ADD  HL,DE
5B55   550              INC  (HL)
5B56   560              ADD  HL,DE
5B57   570              INC  (HL)
5B58   580              DEC  HL
5B59   590              INC  (HL)
5B5A   600              DEC  HL
5B5B   610              INC  (HL)
5B5C   620              POP  DE
5B5D   630              POP  HL
5B5E   640 EMPTY        INC  HL
5B5F   650              DJNZ BIT
5B61   660              POP  BC
5B62   670              INC  DE
5B63   680              DJNZ BYTE
5B65   690              INC  HL
5B66   700              EX   DE,HL
5B67   710              LD   BC,32-WIDE
5B6A   720              ADD  HL,BC
5B6B   730              EX   DE,HL
5B6C   740              POP  BC
5B6D   750              DJNZ LINE
5B6F   760              LD   HL,54288-C
ENT
5B72   770              LD   DE,24576+S
IZE
5B75   780              LD   B,SIDE
5B77   790 LLINE        PUSH BC
5B78   800              INC  DE
5B79   810              LD   B,WIDE
5B7B   820 BBYTE        PUSH BC
5B7C   830              PUSH HL
5B7D   840              LD   H,91
5B7F   850              XOR  A
5B80   860              LD   B,8
5B82   870 BBIT         LD   C,A
5B83   880              LD   A,(DE)
5B84   890              LD   L,A
5B85   900              LD   A,C
5B86   910              OR   (HL)
5B87   920              RLCA
5B88   930              INC  DE
5B89   940              DJNZ BBIT
5B8B   950              POP  HL
5B8C   960              LD   (HL),A
5B8D   970              INC  HL
5B8E   980              POP  BC
5B8F   990              DJNZ BBYTE
5B91  1000              INC  DE
5B92  1010              LD   BC,32-WIDE
5B95  1020              ADD  HL,BC
5B96  1030              POP  BC
5B97  1040              DJNZ LLINE
5B99  1050              CALL SWDOWN
5B9C  1060              EI
5B9D  1070              RET
      1080
5B9E  1090 SWUP         LD   DE,51200
5BA1  1100              LD   B,192
5BA3  1110              LD   HL,16384
5BA6  1120 LOOP         PUSH HL
5BA7  1130              PUSH BC
5BA8  1140              LD   BC,32
5BAB  1150              LDIR
5BAD  1160              POP  BC
5BAE  1170              POP  HL
5BAF  1180              INC  H
5BB0  1190              LD   A,H
5BB1  1200              AND  7
5BB3  1210              JR   NZ,JUMP
5BB5  1220              LD   A,L
5BB6  1230              ADD  A,32
5BB8  1240              LD   L,A
5BB9  1250              CCF
5BBA  1260              SBC  A,A
5BBB  1270              AND  248
5BBD  1280              ADD  A,H
5BBE  1290              LD   H,A
5BBF  1300 JUMP         DJNZ LOOP
5BC1  1310              RET
      1320
5BC2  1330 SWDOWN       LD   DE,16384
5BC5  1340              LD   B,192
5BC7  1350              LD   HL,51200
5BCA  1360 LLOOP        PUSH HL
5BCB  1370              PUSH BC
5BCC  1380              LD   BC,32
5BCF  1390              LDIR
5BD1  1400              POP  BC
5BD2  1410              POP  HL
5BD3  1420              INC  H
5BD4  1430              LD   A,H
5BD5  1440              AND  7
5BD7  1450              JR   NZ,JJUMP
5BD9  1460              LD   A,L
5BDA  1470              ADD  A,32
5BDC  1480              LD   L,A
5BDD  1490              CCF
5BDE  1500              SBC  A,A
5BDF  1510              AND  248
5BE1  1520              ADD  A,H
5BE2  1530              LD   H,A
5BE3  1540 JJUMP        DJNZ LLOOP
5BE5  1550              RET

Pass 2 errors  00

BBIT     5B82      BBYTE    5B7B
BIT      5B40      BYTE     5B3C
CENT     0AEA      EMPTY    5B5E
GRID     6584      JJUMP    5BE3
JUMP     5BBF      LINE     5B38
LLINE    5B77      LLOOP    5BCA
LOOP     5BA6      PART     000A
SIDE     00A0      SIZE     00A2
SWDOWN   5BC2      SWUP     5B9E
WIDE     0014

Table used    298   from    335
```

Dragon

One key wonder

A program to allow the use of single-key entry, making it easier to type in a program

This program was written on a Dragon 32 and enables the user to use single-key entry like the Spectrum and ZX81. Using this method, it is possible to type in a Basic program quicker.

Every time a key is pressed a jump will be made to the program. The program then checks if the shift key is pressed at the same time as a key A-Z. If so, the appropriate keyword is printed and this keyword is also loaded into the keyboard buffer. The program has one disadvantage and this is that when *Editing* Basic program lines the keywords have to be typed in normally.

Type in the program *Run* and save a copy of it before it is Run. Then *Run* the program and after a few seconds the message *Which Key* will appear on the screen. Enter a letter from A to Z and then type in the keyword you want for that key. When all of the letter keys have been defined, type * in response to *Which Key*. The message *New The Basic Program* will appear on the screen and you should then type *New* followed by *CSAVEM"SINGLEKEY", 32400, 33630, 32400*

To use the defined keywords in future, type *Clear 100, 32399* and load in the machine code. You will then need to type *Exec* and the single key entry will be ready for use.

The list of possible keywords is shown in Listing 2.

Listing 1

```
SINGLE KEY ENTRY

10 CLEAR900,32399
20 DIM A$(150),A(150):FORA=1 TO 150:A$(A)="          ":NEXT
30 DATA 134,126,183,1,106,142,126,156,191,1,107,57,52,34,127,65
40 DATA 37,6,129,90,34,2,32,3,53,34,57,183,126,249,182,255
50 DATA 0,132,64,129,0,38,241,247,126,250,16,158,136,47,63,16
60 DATA 159,136,48,31,52,16,182,126,249,72,183,126,249,246,126,249
70 DATA 142,126,121,58,16,174,132,53,16,166,160,129,127,38,14,167
80 DATA 128,124,126,250,52,48,189,181,74,53,48,32,236,128,128,189
90 DATA 181,74,167,128,246,124,250,32,175,0,0
100 FOR A=32400 TO 32[illegible]
110 READ B
120 POKE A,B
130 NEXT A
140 Z=0
150 X=1
160 FORA=32819 TO 33089
170 Y=PEEK(A):IFY>127 THEN FL=A-Z:GOTO360
180 Z=Z+1:MID$(A$(X),Z,1)=CHR$(Y)
190 NEXT
200 FORA=33226 TO 33359
210 Y=PEEK(A):IFY>127 THEN FL=A-Z:GOTO380
220 Z=Z+1:MID$(A$(X),Z,1)=CHR$(Y)
230 NEXT
240
250
260
270 CLS:INPUT"WHICH KEY ";K$:K=ASC(K$)
280 IF K$="*"THEN EXEC 32400:PRINT"NEW THE BASIC PROGRAM":STOP
290 IF K<65 OR K>90 THEN SOUND1,1:GOTO270
300 K=K*2:K=32[illegible]+K
310 INPUT"WHICH KEYWORD ";L$:M=LEN(L$)
320 FOR L=1 TO 101
330 IF MID$(A$(L),1,M)=L$ THEN 350
340 NEXT:PRINT"NO SUCH KEYWORD":GOTO 270
350 Y=A(L):GOSUB 390:GOTO270
360
370 MID$(A$(X),Z+1,1)=CHR$(Y-128):A(X)=FL:X=X+1:Z=0:GOTO190
380 MID$(A$(X),Z+1,1)=CHR$(Y-128):A(X)=FL:X=X+1:Z=0:GOTO230
390
400 W$=HEX$(Y):IFLEN(W$)=3 THEN W$="0"+W$
410 H=VAL("&H"+LEFT$(W$,2))
420 I=VAL("&H"+RIGHT$(W$,2))
430 POKE K,H:POKE K+1,I
440 RETURN
```

Listing 2 LIST OF KEYWORDS

```
FOR       GO        REM                 ELSE
IF        DATA      PRINT     ON        INPUT
END       NEXT      DIM       READ      LET
RUN       RESTORE   RETURN    STOP      POKE
CONT      LIST      CLEAR     NEW       DEF
CLOAD     CSAVE     OPEN      CLOSE     LLIST
SET       RESET     CLS       MOTOR     SOUND
AUDIO     EXEC      SKIPF     DEL       EDIT
TRON      TROFF     LINE      PCLS      PSET
PRESET    SCREEN    PCLEAR    COLOR     CIRCLE
PAINT     GET       PUT       DRAW      PCOPY
PMODE     PLAY      DLOAD     RENUM     TAB(
TO        SUB       FN        THEN      NOT

SGN       INT       ABS       POS       RND
SQR       LOG       EXP       SIN       COS
TAN       ATN       PEEK      LEN       STR$
VAL       ASC       CHR$      EOF       JOYSTK
FIX       HEX$      LEFT$     RIGHT$    MID$
POINT     INKEY$    MEM       VARPTR    INSTR
```


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Commodore à la carte

A machine-code routine giving a neat on-screen menu facility from **Adrian Warman**

The program gives the Commodore 64 a powerful menu selection program which can be incorporated into any program where at some point it is required for the user to choose from a number of different options.

The program will be printed over two weeks and this first installment will be continued next week.

Often screen menus show the different options each with a code number — eg, 1, 2, 3 — and you select which option you want by keying in the relevant code.

Rather than that, the program listed below displays a 'selection cursor' highlighting one item on the menu. The cursor can be moved around the items in the menu until the desired option is highlighted with the cursor. A single key press will then return control back to the main program in which this utility has been incorporated — together with information of which item has been selected.

Three listings are included — an assembly-language version, a Basic Loader version for those without an assembler and a short demonstration program showing the menu facility in use. This week we print the first half of the program notes and assembly language listing. The Basic Loader and demonstration program will be printed next week.

Program Operation

To start the program either type in the assembly language listing or load and run the Basic Loader program. This will place the machine code program into the area of memory from $C000 to $C111.

However, the menu routine will not be initialised until the command *SYS 49152* performed: this will modify the *Usr* vector so that the *Usr ()* function can be used to perform the menu selection.

Once the routine is initialised, its operation can be invoked by using a command of the form:

Item=Usr (dummy), retain, wrap, skip, xstart, xend,ystart,yend

For details of each of the parameters, see the Program Description section below. The easiest way to see how it work is to look at the similar format command at Line 150 of the demonstration program.

Once the menu selection process is started, the selection cursor can be moved through the menu using the *F1* and *F7* function keys. To select the currently highlighted item, press the *Return* key. This will exit the routine. The value returned from *Usr* is the item number of the highlighted menu item. Note that the top element in the menu is always referred to as item number 1, and the second element is always item 2, and so on, *regardless* of the number of blank lines between each menu item. All keys apart from *F1*, *F7* and *Return* are ignored.

Program Description

As described above, the command to invoke the Menu Selection process is:

Item=Usr(dummy) retain,wrap,skip,xstart, xend,ystart,yend

All the parameters above are values which are used to select the tasks performed in operating the menu selection routine.

Item. When the selection process has finished the chosen menu item number will be returned, and can be placed into item.

Dummy. This is any number or numeric variable. It will not be used by the routine.

Retain. Once the selection has been made the programmer may wish to keep the highlight, or else remove it. If *retain* is 0 the highlight will be removed when the selection is made. If retain is 1, the highlight will remain after selection is made. Any other value of retain is illegal, and will produce an error message.

Wrap. As the selection cursor is moved up and down the menu (see below), the cursor will reach either the top or bottom of the list. If *wrap* is 1, then the cursor will wrap-around, in other words, when the cursor reaches the top, any further attempt to move the cursor up-wards will result in the cursor moving to the bottom, and vice-versa. If *wrap* is 0, then the cursor cannot wrap-around. Any other value for 'wrap' is illegal, and will produce an error message.

Skip. A spacing may be required between each menu item in order to make the menus easier to read. *Skip* is used to indicate how many lines to move by, when transversing the menu. A value of 0 for *skip* is illegal, as is any value greater than 5. This upper limit could be changed if desired.

Xstart. The menu is assumed to be a column of items, starting at the column with the number given as *xstart*. The leftmost column has value 0, and the rightmost has value 39. Any value outside this range is illegal.

Xend. This value gives the column number of the end of the highlight area. Again, this is in the range of 0 to 39 inclusive, *but* the value *must* be greater than *xstart*.

The highlight effect is visible by the characters being reversed. However, if no characters are present, then no highlight

```
c000        *=$c000
c000        ;
c000        ;menu selection program.
c000        ;
c000        ;by a.warman.
c000        ;
c000        ;
c000        ;define rom routines and system locations.
c000        ;
c000        hibase=$0288
c000        tstcom=$aefd
c000        getbyt=$b79e
c000        error=$a437
c000        getin=$ffe4
c000        usr=$0311
c000        ;
c000        ;define storage locations.
c000        ;
c000        retain=$008b
c000        wrap=$008c
c000        skip=$008d
c000        row=$008e
c000        xstart=$00fb
c000        xend=$00fc
c000        ystart=$00fd
```

can appear. The effect is best demonstrated by trying the example Basic demonstration program.

For the column numbers, if *xstart* is, say, 10, and *xend* is, say 15, then if the cursor is on a valid menu item row, and some characters are present in columns 10 to 15 inclusive, then they will be highlighted.

Ystart. This is the row number on the screen of the top-most item of the menu. The value must be in the range of 0 to 24.

Yend. This is the lower row of the menu. Again, it must be in the range 0 to 24 but *yend* must be greater than *ystart*.

It is very important that there is a correspondence between the *y* values and the *skip* value. Consider the following example
item=Usr (0),1,1,2,10,20,1,9
which sets up the following effects: When the item is selected, the highlight will remain. As the cursor is moved around, it can wraparound. Finally, there is one blank line between each menu item. The highlight can only appear in columns 10 to 20 inclusive. There should be menu items on rows 1,3,5,7, and 9; since these are the only rows that can be highlighted. Note that there is a 'skip' value of two, which is one blank line between each highlighted line.

How the Program works

Please refer to the Assembly-code listing while following the description.

10-16. The various Rom routines and system variable locations used by the program.

18-31. The storage locations for use by the program. In order to make the routine as fast as possible all addresses are in 'zero-page'. Since there are insufficient locations assigned to the user, some of the random number seed locations have been used as well.

36-40. This is the code which alters the *Usr* vector to perform the menu selection program.

44. Any parameter value which is out of range must cause an error message. This is a jump to the error routine placed here so that branches can be made from within the program.

48-50. Calculates the value for *retain*. The *A* register is loaded with the smallest value which is greater than the maximum for the parameter. Since *retain* can only have the values 0 and 1 the next largest number is 2. Hence *A* is loaded with 2. A sub-routine call is made to *getval* which will get the next value in the command. If the value is illegal (by comparison with the *A* register), then an error will be produced. Otherwise, the value found will be returned in the *X* register, and with the *A* value unchanged. The value in *X* is kept as the *retain* command.

51-52. Finds the value for *wrap*.

53-57. Finds the value for *skip*. The maximum value is 5, hence *A* is loaded with the value 6. On return, a check is made to see if the value is 0 (which is illegal), and if so, an error is produced.

58-61. Finds the value for *xstart*. This cannot exceed 39. The value found is also placed into *posn*, which is used to calculate the position in memory of the menu.

62-69. Finds the value of *xend*. This has *xstart* subtracted from it to check that *xend* is larger than *xstart* and also to find the width of the menu.

The continuation of the assembly language listing and the Basic Loader and demonstration programs will be printed in the concluding instalment of this short series next week.

```
00026  c000              yend=$00fe
00027  c000              from=$0014
00028  c000              posn=$033c
00029  c000              width=$033e
00030  c000              temp=$033f
00031  c000              key=temp
00032  c000              ;
00033  c000              ;
00034  c000              ;intialise program.
00035  c000              ;
00036  c000  a9 0e       init   lda #<start
00037  c002  8d 11 03    sta    usr
00038  c005  a9 c0       lda    #>start
00039  c007  8d 12 03    sta    usr+1
00040  c00a  60          rts
00041  c00b              ;
00042  c00b              ;error jump.
00043  c00b              ;
00044  c00b  4c ee c0    badnum jmp badval
00045  c00e              ;
00046  c00e              ;program area.
00047  c00e              ;
00048  c00e  a9 02       start  lda #$02         ;find parameters.
00049  c010  20 f3 c0    jsr    getval           ;retain highlight?
00050  c013  86 8d       stx    retain
00051  c015  20 f3 c0    jsr    getval           ;wrap around ends?
00052  c018  86 8c       stx    wrap
00053  c01a  a9 06       lda    #$06
00054  c01c  20 f3 c0    jsr    getval           ;what is skip?
00055  c01f  86 8d       stx    skip
00056  c021  e0 00       cpx    #$00
00057  c023  f0 e6       beq    badnum           ;is skip ok?
00058  c025  a9 28       lda    #$28
00059  c027  20 f3 c0    jsr    getval           ;what is xstart?
00060  c02a  86 fb       stx    xstart
00061  c02c  8e 3c 03    stx    posn             ;prepare part of calculation.
00062  c02f  20 f3 c0    jsr    getval           ;what is xend?
00063  c032  86 fc       stx    xend
00064  c034  8a          txa                     ;is xend valid?
00065  c035  38          sec
00066  c036  e5 fb       sbc    xstart
00067  c038  8d 3e 03    sta    width            ;calculate width of menu column.
00068  c03b  f0 ce       beq    badnum
00069  c03d  30 cc       bmi    badnum
```



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BBC & Electron

Playing it cool

Robert Crook fixes a point using polar co-ordinates

The position of a point in a plane is often determined by Cartesian positioning, giving its co-ordinates (x,y) relative to two fixed axes (the x axis and the y axis). It is sometimes useful to fix the position of a point by polar co-ordinates where a fixed line is chosen as the initial line and we fix a point by saying that its co-ordinates are (r,θ). Here r represents the distance between the fixed pole of the line and the point P on the line. The angle, θ, represents the angle between the line extending from the pole to the point P, and the initial line. The diagram below should make this clearer.

P
r
O
Pole
0.1 0.2 0.3 0.4 0.5
r
Initial line

P (0.5, 35°) or (−0.5, 215°)

The task of plotting polar co-ordinates is often very time-consuming and small mistakes can often creep in and ruin results. This program, written for the BBC Model B, allows you to input any equation and then goes on to show the polar graph. You do not need to be a mathematician to appreciate some of the colourful patterns produced.

To use the program you must enter your equation using the letter A to represent *Angle*. You must also enter the angle increments (the smaller the more accurate) and the range of degrees you wish to examine.

An example calculation

Plot the polar graph of $r^2=5^2*\cos(2*A)$

If any mistakes are going to be made it will be at this stage. Although the equation seems to be complete and ready for input, it will not at present give the expected results. In nearly all cases you will use A to represent degrees not radians and so to get the correct graph you must enter the word *Rad* in the equation.

ie. $r^2=5^2*\cos RAD(2*A)$

Of course, if you intend A to represent radians then the word *Rad* should be omitted.

The equation must be entered in the form r... so the correct equation will be $r=SQR(5^2*\cos RAD(2*A))$

Here is what you would enter:

Equation r =SQR(5^2*cosRAD(2*A))
Increments Any number which will give suitable results.
Roots Y (We have used a SQR)
Root=(1/?) 2 (We need SQR.SQR(r)=r½ which is represented by (½))
End angle 360

The computer will now go on to display the graph which in this case is called Bernoulli's Lemniscate (∞ in shape).

In the last equation you will see that I have put 3/2 in the root column. The program asks for the root to be entered as a fraction, so if the root was (1/(1.5)) — as it was in this case — then it must be entered as 3/2. The fraction *must* be in its *lowest terms*. Because of the way I have used error trapping within the program, if you *Escape* into it you will be unable to re-run the program. To overcome this set up a user-definable key as follow:

*Key 0 Print 0/0|M Run|M

To re-run merely press this key.

Some example equations to try

Equation (r=...)	Increments	Roots	End angle	Description
5*CosRADA	2	None	360	Circle
SQR(5^2*CosRAD(2*A))	5	2	360	∞
0.5*(1+0.5*CosRAD(A))	3	None	360	Limacon without loop
5*RADA/100	3	None	360	Archimedian spiral
100*5/RADA	5	None	360	Reciprocal spiral
SQR(5^2*RADA/100)	2	2	720	Parabolic spiral
SQR(100*5^2/RADA)	5	3	720	Lituus
CosRAD(5*A)	1	None	360	5 petals
CosRAD(2*A)	3	None	360	4 petals
SinRADA*CosRADA	2	None	360	4 petals
12/(5-4*CosRADA)	5	None	360	ellipse
(5 1.5*CosRAD(1.5*A))(1/1.5)	2	3/2	720	Flower head

```
10REM**************************
20REM* Polar Co-ordinates *
30REM*        By          *
40REM* R.Crook (C) 1984   *
50REM**************************
60ON ERROR GOTO 280
70@%=&20101
80MODE 7
90VDU 23;8202;0;0;0;
100PRINTTAB(5,5)CHR$(131);CHR$(141)"POLAR CO-ORDINATES":PRINTTAB(5,6)
   CHR$(131);CHR$(141)"POLAR CO-ORDINATES"
110INPUT TAB(5,10)"Equation r="E$
120INPUT TAB(5,12)"Increments",I
130INPUT TAB(5,14)"Any roots operating ",T$
140IF T$="Y" OR T$="y" THEN INPUT TAB(5,16)"Root=(1/?)
   (As a fraction) "R$:PROCDenom
150IF T$<>"Y" AND T$<>"y" THEN R$="0"
160R=EVAL(R$)
170INPUT TAB(5,18)"End angle ";F
180IF F/I<>INT(F/I) OR I<3 THEN CLS:GOTO 120
190IF R/2=INT(R/2) AND R<>0 THEN G=1 ELSE G=0
200CD=0:C=0:A=0:H=0:DIM X(F/I+2),Y(F/I+2),AX(F/I+2),AY(F/I+2)
210X(C)=COS(RAD A)*EVAL(E$)
220Y(C)=SIN(RAD A)*EVAL(E$)
230IF G=1 THEN CD=CD+1:AX(CD)=-X(C):AY(CD)=-Y(C)
240IF ABS(X(C))>H THEN H=ABS(X(C)):AN=A:S=0
250IF ABS(X(C))<ABS(Y(C))THEN 270
260IF ABS(Y(C))>H THEN H=ABS(Y(C)):AN=A:S=1
270C=C+1
280IF ERR=17 OR ERR=25 THEN CLS:REPORT:END
290A=A+I
300IF A<F+I THEN 210
310T=C
320PROCScale
330MODE1:GCOL 0,3
340COLOUR2:PRINTTAB(0,3);"r=";E$
350PROCDraw
360*FX15,0
370T=GET:RUN
380END
390DEFPROCScale
400IF S=0 THEN SX=500*COS(RAD AN)/H ELSE SX=500*SIN(RAD AN)/H
410SC=H/5
420ENDPROC
430DEF PROCDraw
440R=500
450REPEAT
460ANGLE=0
470MOVE640+R*COS(RAD ANGLE),512+R*SIN(RAD ANGLE)
480REPEAT
490ANGLE=ANGLE+20
500DRAW640+R*COS(RAD ANGLE),512+R*SIN(RAD ANGLE)
510UNTIL ANGLE=360
520R=R-100
530UNTIL R=0
```

continued over the page

```
540VDU 19 E 0
550PROCPlot
560PROCPlot 0)
570VDU 5
580GCOL 0,3
590X=0
600REPEAT
610MOVE X,0
620PRINTX/100+SC
630X=X+100
640UNTIL X=500
650GCOL 0,2
660MOVE 610,0:"RATN"
670ENDPROC
680DEFPROCPlot(R$,B$)
690MOVE0,0
700C=0:X=0
710REPEAT
720GCOL 0 2+X
730X=NOT X
740PLOT 69,SX*EVAL(R$+ ( +STR$C+
     .SY=EVAL(S$+     +STR$C+ )
750C=C+1
760PLOT 69,SX*EVAL(R$+    +STR$C+
     SX*EVAL(B$+ ("+STR$C+ )"
770PLOT 85 0 0
780UNTIL C=TP
790ENDPROC
800DEFPROCDenom
810L=LEN(R$)
820A=1:N=1
830IF MID$(R$,A,1)="/"THEN N=N-1
840A=A+1
850IF A<L+1THEN830
860R$=""+D$(R$,1 K(
870ENDPROC
```

In case you were wondering what had happened to the end of Chans Charalambous sound enveloping program printed last week — we ran out of space — so here it is!

```
1790 DEFPROCCLEAR
1800PRINTTAB(0,18)SPC39;TAB(0,25)SPC39
1810ENDPROC
1820**********************************
1830DEFPROCSO(HZ):PROCSOUND
1840P%=4*H%
1850SOUND H%,E%(16+P%),E%(17+P%),E%(18+P%)
1860ENDPROC
1870**********************************
1880DEFPROCSO_OFF:*FX15
1890ENDPROC
1900DEFPROCINSTR
1910VDU19,1,1;0;19,0,2;0;19,3,0;0;:COLOUR3:CLS
1920PRINT''"This is an envelope definer, making
    use of the BBC's envelope abilities."
1930PRINT"You are displayed with the curent
    envelope's & sound's paramet ers."
1940PRINT"Use the cursor keys for moving the
    arrow (";:COLOUR2 PRINT;CHR$ 255;:COLOUR3:
    PRINT;") around."
1950PRINT"The first parameter is the env. number
    and you can change whatever you like."
1960PRINT"The progam tests for invalid entries
    so experiment with any numbe r you want."
1970PRINT"The fuction keys do the following. .""
1980FOR F=0 TO 3:COLOUR2:PRINT"f";F;:COLOUR3:PRINT;
    STRING$(10,".");"SOUND'S CHANNEL ";F':NEXT
1990COLOUR2:PRINT"f4";:COLOUR3:PRINT;STRING$(10,".")
    ;"Stop's all sound""
2000COLOUR2:PRINT"f9";:COLOUR3:PRINT;STRING$(10,".")
    ;"Moves you TOP_LEFT"'
2010COLOUR1:PRINTTAB(5,30)"PLEASE PRESS SPACE/BAR";
    REPEAT:UNTILGET=32:VDU20:CLS :ENDPROC
```

Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Radio alphabet

on Spectrum

Radio Alphabet is a short listing that converts the message typed in into the standard radio alphabet. This is used by aircraft, ships etc because the words produced cannot be mistaken as letters might be (for example 'f and 's' often sound alike on radio)

When using the program, substitute asterisks (*) for spaces. Messages should be no longer than 300 characters although this can be changed by altering Line 20. The program is especially useful if you are trying to learn the radio alphabet. There are some slight variations on the alphabet, such as India which is commonly known as Indigo but this is the world standard version.

Program notes

Line 5	Pokes caps lock on
Lines 10-20	Define arrays.
Lines 40-60	Scan input for spaces and end of message
Lines 70-120	Read from data statement and print words
Line 130	Jump back to input routine.
Line 140	Single data statement containing all words in alphabet

```
   1 REM RADIO ALPHABET
   2 REM ALAN PERSSE 1984
   5 POKE 23658,8
  10 DIM X$(9)
  20 DIM Y$(300)
  30 INPUT "ENTER MESSAGE>", LIN
E Y$
  40 FOR Z=1 TO LEN Y$
  50 IF Y$(Z)="*" THEN LET X$="
"
  60 IF Y$(Z)=" " THEN GO TO 30
  70 FOR W=1 TO (CODE Y$(Z)-64)
  80 READ X$: NEXT W
  90 RESTORE
 100 PRINT X$( TO )
 120 NEXT Z
 130 GO TO 30
 140 DATA "ALFA","BRAVO","CHARLI
E","DELTA","ECHO","FOXTROT","GOL
F","HOTEL","INDIA","JULIET","KIL
O","LIMA","MIKE","NOVEMBER","OSC
AR","PAPA","QUEBEC","ROMEO","SIE
RRA","TANGO","UNIFORM","VICTOR",
"WHISKEY","X-RAY","YANKEE","ZULU
"
```

Radio alphabet
by Alan Persse

Arcade Avenue

Panic time

Ultimate games week First off lets deal with the letters I have had about *Sabre Wulf* Gerald Dawson of Kenilworth has finished the game with a score of 100, 820 even though he was not "playing for points" He tips as that the four medallions pieces are found in any of the 36 dead end clearings and, of the incredible 256 locations, 71 need not be entered at all.

Guy Fothergill of Leicester has completed the game with 88% and 76,865 points and has mapped 251 of the rooms.

Many thanks to Michael Smith of London who as well as sending in a score of 220,110 and 89% has offered many useful hints:

"1) Look out for red rocket shaped objects (statuettes) as these give you extra lives The program only allows me nine extra lives - this is a bug

2) Keep fight button pressed whilst moving as monsters appear in your path.

3) Use the orchids as much as possible except the white.

4) Do not stay too long on the same screen as the fireball appears - move on to a new screen and then return and it will have gone.

5) The medallion pieces look like flashing parts of a jig-saw puzzle

6) If in trouble move between two screens near an orchid bud until it blooms - the blue flower is best as it doubles your speed and makes you invincible.

Paul Holden of Bolton, whose best score is 49%, warns that the flames and the Sabre Wulf are both invincible and fatal if touched. He explains that yellow orchids stop you but clear all hazards on the screen, red orchids either slow you down or make the keys work in reverse, although they do make you invincible, white orchids return you back to a normal state

On to *Atic Atac* Thanks to Steven Stoner of Southampton who has scored 99% (as has his mum whilst his seven year-old-brother has scored 89%) for the following tips.

"1)Always keep your finger on the fire button as this will save you in times of panic.

2)Open as many coloured doors as possible as this increases the percentage. They will remain open.

3) You must assemble the parts of the AGG key in the correct order in your scroll before passing through the main door.

4) The cross makes Dracula back, off, the bag of money lures the hunchback away from the door and the spanner will destroy Frankenstein.

5) Although the keys and the AGG parts do appear with some randomness the same locations occur fairly often — so note them down.'

Steven is keen to know if 100% is possible of is it an unobtainable goal to keep people playing So please write in and let me know if anyone has done it.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to Tony Kendle, Arcade Avenue *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD

Areas

on Vic20

The program calculates the approximate area under the graph of a function defined by the user. This will be a useful check for many problems in mathematics and physics.

The function is defined in Line 100, and in listing provided is the square root of X. The program can thus be modified for other functions by altering the definition of function.

Once the required function has been declared the program can be run. The computer asks for the lower and upper limits which correspond to the X co-ordinates between which the area is to be worked out. The upper limit must always be greater than the lower limit, if not the user is asked to input new values.

After the successful input of the limit the program calculates an approximate value for the function defined, using Simpson's rule. This is then printed out.

Variables

Function A contains the equation of the graph
LL = lower limit
UL = upper limit
NS = number of strips
H = strip width
SM = area under the graph
X = x co-ordinate
Y = y co-ordinate
C = counter

```
 2 REM AREA APPROXIMATION
 3 REM COPYRIGHT
 5 REM  ***CALCULATE AREA***
 10 PRINT"□"
 90 REM ***FUNCTION***
 92 REM
 95 REM
 100 DEF FNA(X)=SQR(X)
 200 INPUT"LOWER LIMIT ";LL
 210 INPUT"UPPER LIMIT ";UL
 220 IFUL=<LLTHENPRINT"□UPPER LIMIT MUST BE  ▮ GREATER THAN LOWER▮ LIMIT'▮▮":
GOTO200
 230 PRINT"▮▮PLEASE WAIT.           CALCULATING AREA."
 250 NS=1000
 300 H=(UL-LL)/NS
 350 SM=0:X=LL
 400 FOR C=1 TO (NS-2) STEP 2
 500 LET SM=SM+(4*FNA(C*H+X)*H/3)
 600 LET SM=SM+(2*FNA((C+1)*H+X)*H/3)
 700 NEXT
 800 SM=SM+(FNA(LL)*H/3)+(FNA(UL)*H/3)
 900 SM=INT((SM*10)+0.5)/10
 1000 PRINT"▮▮THE AREA IS";SM
```

Areas
by I Shambrook

GW6JJN

Roving radio

A new company called Crystron is marketing a 'Black Box' — its name, not mine — which is designed to help companies keep in touch with their employees on the road. The Black Box is basically an interface with converts information received over the air into RS232C format suitable for a portable terminal rather like the Tandy Model 100. It works from a car battery so that the company employee can sit in his or her car with a two-way radio, the Black Box and the portable terminal, and communicate with the company's central computer.

Operating on ultra-high frequency (UHF) the range is about a hundred miles or so. The company computer will act as a base station Black Box and be able to 'talk' to the car. The purpose seems to help field sales people work out quotations and be aware of stock, etc, as well as to place orders directly. With a price tag of £1500 per mobile unit and around £4000 for the base unit it's a bit beyond me but I'm sure someone will find a use for it.

If you worry about losing your software on tape or disc during a major fire, Inmac, the computer consumables people, have the answer for you in the shape of their data-safe. It has been tested to 1090°C in a special oven and the software survived. So for £450 pounds or so you can sleep peacefully in the knowledge that if your home and all its contents are burned to a crisp, your favourite computer game will make it.

Many of you write to me about the radio-frequency interference (RFI) that your computer clock gives out causing havoc to radio transmission and reception, usually when using a radio teletype system. There is no completely satisfactory answer to this, although much can be done to alleviate the problem by using various screening devices from metal foil to biscuit tins.

I was reminded of the problem recently when reading a press release from a company called Grid System Inc. It would appear the the Ministry of Defence have a similar problem in that data transmissions from Embassies and the like must not give out RFI in case someone may be listening who can make some sense of it all.

The Ministry set a standard as regards RFI screening which is met by the Grid 1107 portable computer. With 512K Ram and 38K of bubble memory, it comes in two versions shielded and unshielded. The unshielded version is £5,195 and the shielded version is £10,500. What price radio interference now, you might well ask...

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Open Forum

Tandy convert

on Dragon

This is a program to convert any Tandy Basic program into Dragon Basic. It is a short machine-code routine loaded in as Basic data statements. To use the program simply load in the routine and load in the Tandy Basic program. Then type Exec 32600

```
0 PRINT"decodeBASICprogramsFROMtandy" PRINT
1 REM  1983 COFFINET ETIENNE               1984 COLINA JULIAN
2 CLEAR200,32599 FOR A=32600 TO 32720 READC POKEA,C NEXT A
3 PRINT"CLOAD decode & [RUN]                REMEMBER [EXEC32600]
  " PRINT PRINT"CLO AD TANDY PROGRAM & EXEC32600 THEN RUN NEW
  PROGRAM FOR DRAGON & CSAVE ITSEL. ALL  IS O.K. !!!  "
4 DATA 190,0,25 48.4,188,0,27 44,62.230.128,193,0,39,243,
  193,255,39,22
5 DATA 193.141,35,237.16,142,127,161,16,140,127,181,39,227,
  225,164,35.20,49.34,3  2.242.290.120,193.130.35,213,16,142,127,
  181,16,140,127,209,39,203,225,164,35,4,4  9.34.32,242.235.33,
  231.31,32,189,57
6 DATA 150.1.163,2,166,23,180.24.184,241,105,223,186,212,203,
  239,204,242,205,0,1 31,30 132.0.133,3,141,6,147,8,148,247,150,
  244,151,240,152,252,153,237,154,233,15 5,234.156.249 161,255
```

Tandy convert
by Julian Conlina

Baud Walk

PSS – certainly

News comes first this week about two new bulletin board sevices that have sprung up lately. The first one is at Nottingham and supports 1200/75 baud modems using standard terminal software. Telephone number is 062 283 783 - and it's open 24 hours a day too.

The second service I have heard of is to be operated by BASUG, the UK Apple Users Group. This will be a multi baud rate board (300/300 1200/75) and the telephone number is 0268 778956. This should be a good service as BASUG has plenty of experience, information and public domain software to offer.

I've also heard about a new cassette magazine that is being specially written for Spectrum users who have a modem (in most cases these will be owners of the VTX 5000) and really want to get into communications. Apparently the author is an avid hacker who regularly uses services like Prestel, Compuserve (the American version of Prestel) and the like.

On to some more serious communicating, I thought I should look at PSS, it's the Baud Walk equivalent of American Express in that you need a healthy bank balance, but it does very nicely thank you!

PSS is BT's data network which allows you access to databases and services not only in the UK, but all around the world. A number of service operators offer PSS connection to their system as it has a number of local call points in — the UK — thus avoiding STD calls.

Users of PSS have to take out a subscription to the service but the advantage is in the long distance connections. For example, a 30 minute call to London on STD costs around £2.47 — using PSS it's. The more you use PSS — within reason — the quicker you will recover that subscription charge, at least that's the idea.

In fact, PSS is not dependant on distance for tariff charges in the UK — and this only partially applies to international access to — but depends on the amount of data you send along the wires. UK calls can cost as little as 2p a minute and a typical connection to the States around 12p per minute.

Full details about PSS can be obtained from BT Marketing on 01-920 0661, or better still, try your local librarian. Who may be able to give you good advice and recommend reading a database directory. On my reckoning, the States has at least around 1000 databases - some commercial and private, but other public, plus, of course, bulletin boards.

PSS differs from the normal telephone network in that it is tailor-made for digital communications - in other words for micro communications. In fact, BT appears to be about to offer more digital services next year that could well offer a cheaper alternative to PSS. Apparently a 300/300 network will be tested next year and it will be cheaper than the normal telephone network.

If you have access to a PSS account try the following numbers for overseas databases but remember the cost.

Source # 01 01 703 734 7600
Compuserve 01 01 313 789 6800
Telenet # 01 01 703 442 1383
Tymnet # 010 01 408 446 7000
Uninet # 01 01 913 341 9161

If you are feeling really adventurous why not get an information pack from Compuserve. Write to Compuserve Inc, 5000 Arlington Boulevard, Columbus, Ohio 43292, USA.

Robin Wilkinson

Baud Walk is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, Baud Walk, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD.

He can also be contacted on Prestel mailbox 319983727.

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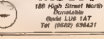
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Tony Bridge's Adventure Corner



Across the pond

There's a well used saying which is especially rampant in the computer world, that what is currently popular in the United States will one day be imported to Britain. The common feeling is there is usually a delay of several months before we see the best selling software from America. This is not to say that the software from across the Atlantic is necessarily better — programs such as *Lords of Midnight*, *Valhalla* and *The Hobbit* would be received with ecstasy over there, but it is true to say that there are *many* adventures there that, thanks to the widespread use of the disc drives, are much more complex than is the norm in Britain.

Assuming, however, that with the popularity of the CBM64, Apple and Atari, we can expect to see American adventures in the next few months, let's see what is brewing over there

Available now, on disk and cassette for the Commodore system and soon for the Atari, Apple and IBM PC/PC Jr (the latter system is looked on very much as a home computer in the States), is *Dallas Quest*, from Datasoft, the company that bought you *Zaxxon*, among other great arcade games.

The lifelike scenes draw the player into the sumptuous Texas mansion of Southfork and then into the steamy jungles of South America to rub elbows with, and outsmart, crafty J R Ewing. In the game, you take the part of a world famous detective, who in solving the challenge of each scene, must find the map which reveals the whereabouts of a South African oil-field.

"Interactive Fiction" is the latest buzzword in America for adventures, and Spinnaker Software, authors of such education-orientated software, have taken advantage of the name and come up with several programs adapted from classic novels.

It's a route that others have taken (as in *The Hobbit*, the best-known that we have here) but Spinnaker's adventures are aiming for a wider audience, with titles such as *Swiss Family Robinson*, *Wizard of Oz*, *Gulliver's Travels* and *Below the Root* (based on the Green Sky Trilogy). The adventures allow the use of full sentences and support full graphics. Most are of the traditional variety, with puzzles to be solved, but *Below the Root* is more of a Monster-Bash, with the player moving around a graphic landscape as in *Ring of Darkness*.

The target audience of this range of games seems to be rather young, and it would seem to be a good series with which to learn about adventures. Other titles in the series, to be released later this year, are *Wind in the Willows* and *Treasure Island*.

Arthur C. Clarke

"Suddenly, quietly, inexplicably, a huge new asteroid appears in the Solar System. After lengthy observations, the impossible explanation becomes the only one. the asteroid is actually a spaceship. Mankind must attempt a rendezvous" If this sounds familiar, it's not surprising, as it is the plot of a new adventure based on Arthur C Clarke's *Rendezvous with Rama*. But read on.

As luck would have it, the only spaceship close enough is your own — the Endeavour. You must explore the asteroid and, if you are lucky, return to Earth." Trillium is a name that Spinnaker Software has adopted for a series of adventures based on well-known Science Fiction titles. Clarke's classic is the first, and others will follow from Robert Heinlein, Alan "Alien" Dean Foster, Ray Bradbury, Michael Crichton, Phillip Jose Farmer, Alfred Bester and others.

These adventures will be available for the usual mix of Commodore 64, Apple and Atari machines, but the interesting thing about them is that they have been written with full co-operation of the authors — so the story-lines will be pretty good.

A new release from Infocom is always worth waiting for, and their new adventure *Seastalker*, is no exception. This one has you undersea, and the mission is to rescue Aquadome, "the world's first undersea research station", from destruction.

Infocom calls this a beginner's adventure, aimed at younger player. In fact, one of the authors, Jim Lawrence, has written *many* of the Nancy Drew and Hardy Boys mysteries.

Seastalker comes with the usual brilliant Infocom packaging, which in this includes a unique Help Decoder, which can be used to reveal one clue at a time.

Quest of the Space Beagle, as befits its subject, is a huge program covering four disc sides — it's the sequel to the even bigger *Jupiter Mission 1999*, which filled a staggering eight sides. As you might guess, your role in both the programs is to, yup, save the universe again, but the authors have really gone to town and created a sprawling, complex adventure which includes stunning graphics, arcade sequences and plenty of strategic planning. It's from Avalon Hill for the Atari.

For the Commodore 64 is *Ripper!*, a role-playing adventure game that puts you in the shoes of the detective responsible for tracking down old Jack. If your IBM-PC is lying idle, how about treating it to *Diplomacy*? Not strictly adventure, I know, but I think this is the first version available for a computer.

Also for the IBM only, but soon for the Apple, is a very interesting-looking program from Sierra on-Line who brought you *Frogger*, *B C's Quest for Tires*, *Dark Crystal*, *Cranston Manor* and the Ultima series. It's a graphic adventure, which includes many animated sequences and joystick control.

The Americans seem, to me, to be quite a long way behind us when it comes to graphic adventures — a program like *Valhalla*, for instance, now that it is available on the CBM64, should become a huge hit in the States, where complex sentence recognition and input is only just making an appearance in graphic adventure.

Still, it promises to be a busy time over the next few months for us adventurers, and I think we are going to reap a lot of benefit from all the research the programmers have done with arcade games.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair — help is at hand.

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Peek & Poke



Squiggles

David Steventon of Tipton West Midlands writes

Q **Our family owns a ZX Spectrum and we have almost mastered the art of programming in Sinclair Basic. When I say almost I may be exaggerating, but there is one thing that gets on my nerves: The number of characters used in the extended mode which we hardly ever use — such as the tiny little squiggles and many others. I would like to know if there is any way that we can use any of these hindrances to extend the 21 graphics characters available? I'm sure many other Spectrum owners would like to be able to put more graphics into their programs and so would I. I use in the middle of a program and I used 18 graphics just making a man dive to the floor.**

A Page 173 of the Spectrum manual describes (among others) a system variable called *Char$* The description of this variable states that you can define your own character set in Ram and make the Spectrum use it by making *Char$* point to it. This can be achieved by copying the character set into Ram and you can then change any character you wish (even the little squiggles) to whatever you like

Unpredictable

R Bain of Sherwood, Nottingham writes.br

Q **When I poke address 53272 on my CBM 64 in the range 0-255 and then *Peek* the same address, only in some cases is the *Peek* value the same as the *Poke* ie *Poke* 53272,0:*Print Peek* (53272) gives value 1.**
***Poke* 53272,1:*Print Peek* (53272) gives value 1.**
***Poke* 53272,2:*Print Peek* (53272) gives value 3.**
Only odd numbers are returned, can you tell me the reason why this should be?

A Address 53272 is used by the Vic memory control register (mentioned on page 104 of the *Commodore Programmers Reference Guide)* This address is used in conjunction with address 53265 to set up a high resolution bit-map in memory eg
*Poke*44 64:*Poke*16384,0:New
Poke 53265,*Peek*(53265) Or 32 Rem turns on bit map mode
Poke 53272,(*Peek(53272)* And 240) Or 8.

These instructions set the start of Basic memory at 16385, and use locations 8192 to 16383 to store the high resolution bit-map As to why the value changes, I would think that as this location on its own is used by the screen refresh routine (amongst others) and that its value is probably quite unpredictable

Going off

P Reynolds of Buxton, Lancs writes

Q **I am writing to you to see if you could solve a problem of mine. I have had a 16K ZX81 for over a year and have just purchased an AGF interface. Now, suddenly the computer goes off, but when I take the Rampack off it is all right. Please could you tell me what to do.**

A It looks as though your Rampack has developed a fault. It may be just coincidence that it occurred at the same time as your purchase of the interface, or it may be that in fitting the interface you unwittingly damaged the connectors on the Rampack As you are out of your guarantee period, your only solution is to get your Rampack repaired A firm near you, PV Tubes, 104 Abbey Street, Accrington, *Lancs*, will be glad to estimate for a repair on your machine I have had a number of letters from readers who have had excellent service from this company, whose prices are also very reasonable They can be telephoned on (0254) 32611

Gone dud

R B Charles of Glasgow writes.

Q **I want to replace a Z80A CPU as the one in my Spectrum has gone dud. Will a Z80A CPU from any dealer do the job, as I have been told that I would need to get a special Z80A CPU?**

A It would be as well to purchase components designed to work with the Spectrum R A Electronics supply Spectrum Z80A CPUs at $3 00 (including postage and packing) Their address is 30 Kimberley Road, Lowestoft, Suffolk.

Nonsense

Richard Smith of Birmingham writes

Q **Having bought the much recommended book *Spectrum Machine Language for the Absolute Beginner* published by Melbourne House, I first read through it and found it very useful But then I decided to type in their *Excode* machine code monitor This was when the trouble started. The program did not work The problem occurred at Line 2090 and gave a *Nonsense in Basic* error. Finding the program impossible to debug, I wrote to Melbourne House They sent me back a duplicated sheet with about five mistakes on it. Therefore I typed in the program again without these errors. Again all I got back was the same error**

If I wrote to Melbourne House again I feel that all I would receive would be the same duplicated sheet What else can I do?

A Line 2090 in my copy of the book reads: *2090 IF K=5 OR VAL K$=ZE OR VAL K$=LN THEN GO TO MR*

I have deliberately typed all the variable names in upper case because it seems to me that you may have confused the lower case *L* in LN with a *1* This would result in a Nonsense in Basic message being produced for that line

If this is the cause of your problem then you will have to check through the rest of the program to make sure that you have not been misled elsewhere

Failing that, if you could get your version of the program listed (as you typed it in) I will be glad to investigate the problem further for you.

Monochrome

Peter Muntsch of Glasgow writes

Q **I have a problem with my Issue 2 Spectrum, in that the colour on my Sanyo portable colour TV isn't. Originally when I got the TV, the display was black and white, so I adjusted the computer internally to get the proper colours. Unfortunately the TV was not properly on channel, so that if I changed channels then changed back again the picture went back to black and white Shortly after this I returned the TV but the colour still is not right.**

A Issue 1 and 2 Spectrums are notorious in this respect I am afraid. The Issue 3 machines are very much better in this area. There is not a lot I can suggest for you to do I presume that since returning your TV you have tried re-adjusting the computer internally with no success Apart from that there is not really anything you can do

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SWAP OR SELL lots of VIC 20 games All are originals. For details ring 051 644 8028 after 6pm or weekends

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WANTED ZX SPECTRUM 16/48K Anything considered Will pay reasonable price or part exchange for BBC software Latter titles Including Overdrive, Sellistank Spitfire Command + others Tel Frome (0373) 61562 Jonathan

DISK DRIVE for Atari 800 Tel 01 954 5275

Diary

Event	Dates	Venue	Admission	Organiser
Electron and BBC Micro User Show	Aug 31-Sept 1 10.00am-6.00pm Sept 2 10.00am-4.00pm	UMIST Manchester	£3.00 adults £1.00 children	Database Publications 061-456 8383
London Bug 84	Sept 1 10.00am-6.00pm Sept 2 10.00am-5.00pm	Royal Horticultural Society's New Hall, Greycoat St, London SW1	£1.50	Content Workshop 01-965 3712
Hampshire Computer Fair	Sept 6 11.00am-9.00pm Sept 7 10.00am-5.00pm	Guildhall, Southampton	Trade — free Public — £2.50	Technical Exhibitions 0303 31857
Walthamsoft 84	Sept 8 10.00am-5.00pm	Main Exhibition Hall, Waltham Forest Technical College Forest Rd, London E17	£1.00	London Exhibitions and Promotions 01-484 8318
ZX Microfair	Sept 8 10.00am-6.00pm	Alexandra Palace, London N22	£1.50 adults 80p children (in advance)	ZX Microfairs 01-801 9172
Personal Computer World Show	Sept 19-22 10.00am-7.00pm Sept 23 10.00am-6pm	Olympia 2, Hammersmith Rd, London W6	£3.50	Montbuild Ltd 01 486 1951

New Releases

Twentieth

Son of Blagger is a spin-off from *Blagger* which in turn was heavily inspired by *Manic Miner* Matthew Smith could never have suggested what he was going to start

However, *Son of Blagger* happens to be a particularly fine form of this style of game

The idea is to left-right-and-jump your way around a secret headquarters, collecting gold-and keys. There's a lot to explore, things to climb, conveyors, slides and dissolving floors Various lunatic things happen in the different rooms (twelve in all) and as ever, it's a matter of figuring out when and where to jump

Alligata have thoughtfully provided a layout showing the entire game area so you can see what you are missing as you get killed in the first screen for the twentieth time

In fact, if this didn't draw quite so much from *Miner/Jetset Willy* I'd really rate it very highly indeed.

Program *Son of Blagger*
Price *£7.95*
Micro *Commodore 64*
Supplier *Alligata*
178 West Street
Sheffield
S1 4ET

Nursery crime

Adventure games are commonly the province of a certain kind of teenage or young adult — generally the same people who like science fiction and often as not ancient progressive rock bands like Genesis

But *My First Adventure* is not for them

Jolly Rodgers software has decided, rather sensibly that the younger kids could be persuaded to enjoy adventures too, hence the rather yukshly titled *My First Adventure*

The only concession to this game being for young kids is the fact that the spelling is guaranteed correct and the problems are not quite so nightmarish as in some of the more braining-damaging traditional adventures. That apart, it has the usual verb noun entry and I found it pretty difficult — for example, you keep meeting all these nursery rhyme characters but I never did find out what on earth you're supposed to do with them However I can tell you that 'Kill Little Boy Blue' doesn't work, neither does 'Get Little Miss Muffet'

There are graphics for many of the locations which are as good as anything you'll see in most other games and the whole game does, indeed, seem to be correctly spelt. For an adventure game this must be a record.

Program *My First Adventure*
Price *£5.95*
Micro *Commodore 64*
Supplier *Jolly Rogers*
18 Castleton Avenue
Barnehurst
Bexleyheath
Kent DA7 6QT

Gaseous

Wye Valley software have come up with a sort of occult equivalent of *Jetpac* for the Commodore 64

It's called Merlin and is pretty entertaining You move the individual of the title around the screen, avoiding vast numbers of ghosts, ghouls, and other Hammer Horror type things Merlin moves about either on a cloud or his broomstick needs a new exhaust since he appears to be sitting on something gaseous

In *Jetpack* you had to collect bits of spacecraft and assemble them to make your escape here you must collect the ingredients for the caldroun (to nasty to go into any detail except to say they include a frog's leg) dropping them in one by one

Every so often a parachute drops down and can neutralise the spells you've collected so far if you don't watch out and zap it quickly Four screens is probably not enough and I'm surprised more weren't included — not memory restrictions surely? Still I found it fast and snappy and you probably will too

Program *Merlin*
Price *£6.90*
Micro *Commodore 64*
Supplier *Wye Valley Software*
Parton House
Kinnersley
Herefordshire.

Marsupial

Superior Software consider *Wallaby* to be one of the best programs they have ever released.

I think that Sprectrum owners would probably greet it with a yawn but it ranks well alongside other BBC arcade games and has a certain amount of humour to redeem it as well.

Wallaby is a platform and ladders game vaguely similar to *Donkey Kong* in that you have to climb to the top in this case to rescue a stolen Wallaby, avoid various thing being chucked at you by a group of monkeys and collect fruits for bonus points

Pick of the week

Edge-on 3D

You may have seen a rather impressive looking ad. for a couple of games for the Commodore 64 recently - the games are *Flip & Flop* and *Astro Chase* and the company is Statesoft.

Flip & Flop proved to be an absolutely wonderful *Q-Bert* where you bounce around a lattice of squares changing their colour as you go whilst being chased by a variety of stange animals.

In *Flip Flop* you are, alternately, a kangaroo and a monkey - the kangeroo bounces over a number of lattice platforms changing the colour of certain marked squares It can move from one level to the next only where there is a ladder It's easy to take one bounce too many and go hurtling into space

The monkey is on the 'underside' of the platorm, swinging from one to the other, again watch out for that one swing too many The rum of many of us

The 3D logic of what's where in 3D and which direction to press the joystick proved more than enough for me, but later levels have you chased by a zoo keeper and what looks like an iron grate

What really makes the game is the impressiveness of the graphics — the edge-on 3D lattice of squares seemingly suspended in space is the kind of thing you can find in the better science fiction films, ie genuine other-worldlyness It is only the constant frustration of leaping into infinite space that prevents me from naming this the best Commodore game of oh, well, yonks and yonks anyway

Program *Flip & Flop*
Price *£6.99*
Micro *Commodore 64*
Supplier *Statesoft*

You, I hasten to add, are a grown-up Wallaby (which looks, for all the world, like a Kangaroo so far as I can see) This means that you can bounce over some of the obstacles and, in true Tom and Jerry tradition, biff monkeys and obstacles alike with a swift uppercut from the paw

It's good fun, even if there is a sense of deja vu about it all. I did enjoy the wallaby's bounce complete with bouncing noise

Program *Wallaby*
Price *£7 95*
Micro *BBC*
Supplier *Superior Software Regent House Skinner Lane Leeds LS7 1AX*

Pool perm

The pools prediction program *Spectadraw* has been around in some form or another for a good long while now, but the latest highly advanced, souped-up and permutated version complete with Currah speech compatability and proper instruction manual has arrived.

Quite simply, the program uses a large database of information on the past scores of teams to predict what will happen in the future. It will predict the teams most likely and less likely to draw and, if you wish, generate ten 8 from 10 full cover lines which can be copied straight on to the pools coupon using a *Spectasort* perm generation program incorporated in the main program.

The manufacturer's say that using the program ups your likelihood of winning by 20 to 30 per cent What this means, in practice, is a fair likelihood of a series of small wins rather than much chance of a massive payout.

The program has been adapted for use with microdrive so that data can be easily saved — the reason for this being that you can develop the database as you go along adding more and more results and theoretically at least, making it more reliable

Program *Spectadraw 3*
Price *£9 95*
Micro *Spectrum*
Supplier *Spectadraw 1 Cowlease Chinnor Oxford OX9 4TD*

Bluff

I have waited for a long time for someone to bring out a version of poker for the computer The mysterious Jungian collective consciousness has struck again and several versions have appeared all at once, for a variety of machines.

One, simply called *Poker*, is for the Spectrum. This one plays pretty much the standard game — dealing few rounds of betting on what you've got followed by a change of cards to develop that hand and more betting

You play against four other players all of whom are controlled by the computer They raise the stakes of fold or bluff like real players although obviously with a computer involved the challenge is to make them behave sensibly

Over a couple of hands I found them pretty convincing Two complaints — you appear to be limited in how much the computer will let you bet and if by some judicious and brave bluffing you get everyone else to fold there is no chance to see their cards (I know you're not supposed to but I should at least be an option) — ie, to determine whether you would have won on cards, or better still, that it was your sheer bravado that did it

Nevertheless, perhaps because I like poker I shall be playing this more than most of the other games released recently The definitive computer poker that really induces the tension and anxiety of the real thing has yet to be produced though.

Program *Poker*
Price *£6 95*
Micro *Spectrum*
Supplier *De Barron Software Bowie Hillock Fyvie Aberdeenshire*

Shuffling

Atlantis are a new company marketing games for £1.99 — the 'pocket money' price initiated by Mastertronic The first release I've seen from the company is *Eights* — a computer implementation of the popular card game.

The idea of the game is to get rid of all the cards in your hand — the two players must follow the 'lead' of the previous card and many only discard a card of the same suit or the same value. The eight is treated as a special card and can be used to change the suit to whatever you want, either to make it difficult for your opponent to go and/or easier for you to continue discarding cards If you can't go you must pick up a new card

In this computer version the computer plays very well and I hardly ever beat it on its simplest level of play, proving, since the cards are shuffled randomly for each new game, that it isn't a matter of luck. The game is thoughtfully designed, entering your card choice is very sensible and logical - J followed by C equals Jack of Clubs. Trouble has been taken, too, in the form of redesigned character sets - shuffling noise and so on. In short, this is wonderful value for money, and if you like playing card games on computers, a must

Program *Eights*
Price *£1.99*
Micro *Spectrum*
Supplier *Atlantis Software 19 Prebend Street London N1 8PF*

Pie fight

There's no doubt about it, a lot of companies are dropping their prices Comsoft, a BBC and Electron house has it's price at £4 95, around £2 to £3 cheaper than the BBC norm.

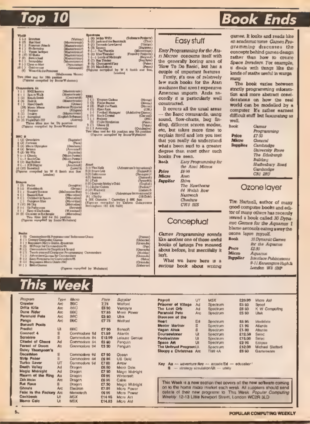
Custard Pie Fight is an absurdly simple idea.

The game simply consists of two figures facing one another trying to throw dodges pies - you play either against a friend or computer That's all there is to it, but the simple pleasures of splatting someone in the face entertain for quite a while Good for several laughs.

Program *Custard Pie Fight*
Price *£4 95*
Micro *BBC*
Supplier *Comsoft 7 Roman Drive Leeds West Yorkshire LS8 2DR*

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, *Popular Computing Weekly* 12 13 Little Newport Street, London WC2R 3LD



Top 10

Vic-20
1 (–) [illegible] (Visions)
2 (7) Star Hunt (Mastertronic)
3 ( ) Phantom Attack (Mastertronic)
4 ( ) [illegible] (Mastertronic)
5 (–) Vegas Jackpot (Mastertronic)
6 (10) 3D [illegible] (Mastertronic)
7 (9) Bewitched (Mastertronic)
8 ( ) Scrambler (Mastertronic)
9 (–) [illegible] (Paramount)
10 ( ) Gridrunner (Llamasoft)
(6) Wizard & the Princess (Melbourne House)
Two titles tied for 10th position
(Figures compiled by Boots/Websters)

Commodore 64
1 ( ) BMX Racers (Mastertronic)
2 ( ) Space Walk (Mastertronic)
3 (2) Beach Head (Centresoft)
4 (4) Hektik (Mastertronic)
5 ( ) Hunchback (Ocean)
(10) Manic Miner (Software Projects)
(–) Blagger (Alligata)
8 (1) Squirm (Mastertronic)
9 (–) [illegible] (English Software)
10 (8) Flight Path 737 (Anirog)
Three titles tied for 5th position
(Figures compiled by Boots/Websters)

BBC B
1 (1) Overdrive (Superior)
2 (2) Fortress (Pace)
3 (3) Micro Olympics (Database)
4 (4) Aviator (Acornsoft)
5 (3) Mr Wiz (Superior)
6 (—) [illegible] (Micro Power)
7 (—) Stock Car (Micro Power)
8 (5) Star Striker (Superior)
9 (—) JCB Digger (Acornsoft)
10 (10) Snowball (Level 9)
(Figures compiled by W H Smith and Son London)

Dragon
1 (3) Pedro (Imagine)
2 (1) Hunchback (Ocean)
3 ( ) Hungry Horace (Melbourne House)
4 ( ) Buzzard Bait (Microdeal)
5 ( ) Cuthbert in Space (Microdeal)
( ) Dungeon Raid (Microdeal)
7 (10) Mr Dig (Microdeal)
8 (–) Up Periscope (Beyond)
9 ( ) Ring of Darkness (Wintersoft)
10 (2) Cuthbert in the Jungle (Microdeal)
Two titles tied for 5th position
(Figures compiled by Boots/Websters)

Spectrum
1 (4) Jet Set Willy (Software Projects)
2 (5) Jack and the Beanstalk (Thor)
3 (1) Tornado Low Level (Vortex)
4 (3) [illegible] ([illegible])
5 (—) Full Throttle (Micromega)
6 (6) Blue Thunder (Foundry Projects)
7 (—) Lords of Midnight (Beyond)
8 (7) Star Trader (Bug-Byte)
9 (6) Chequered Flag (Psion)
10 (8) Match Point (Psion)
(Figures compiled by W H Smith and Son, London)

ZX81
1 (1) Krypton Galaxies (Novus)
2 (3) Planet Raiders (Quicksilva)
3 (4) Walk the Plank (Novus)
4 (1) Alien Rain (CRL)
(–) Football Manager (Addictive Games)
6 (6) Black Crystal (Carnell)
7 ( ) Project (PSS)
(8) Flight Simulation (Psion)
9 ( ) Chess IX (Psion)
10 ( ) Asteroids (Quicksilva)
Two titles tied for 4th position and 7th position
(Figures compiled by Boots/Websters)

Atari
1 (1) The Hulk (Adventure International)
2 (2) Bruce Lee (Datasoft)
3 (3) Encounter (Novagen)
4 (5) [illegible] (Datasoft)
5 ( ) Flak (Funsoft)
6 (6) Captain Sticky's Gold (English)
7 (–) Super Cobra (Parker)
8 (10) Warlock (Calisto)
9 (–) Saga 6 (Adventure International)
10 ( ) [illegible] (US Gold)
§ 16K Cassette * Cartridge ‡ 48K disc
(Figures compiled by Calisto Computers Birmingham (021 632 6458))

Books
1 (5) Commodore 64 Programmers' Reference Guide (Pitman)
2 ( ) Creepy Computer Games (Usborne)
3 ( ) Beginners Micro Guide, Spectrum (Granada)
4 (3) 60 Programs for Commodore 64 (Pan)
5 ( ) Commodore 64 Graphics & Sound (Granada)
6 ( ) Teach yourself Computer Programming Commodore (Hodder)
7 ( ) Adventure Games for Commodore (Granada)
8 (–) Easy Programs for Commodore 64 (Shiva)
9 (1) Beginners Micro Guide VIC (Granada)
10 ( ) Brain Games (Usborne)
(Figures compiled by Websters)

Book Ends

Easy stuff

Easy Programming for the Atari Micros concerns itself with the generally boring area of 'How To Do Basic', but has a couple of important features.

Firstly, it's one of relatively few such books for the Atari machines that aren't expensive American imports. And secondly it is particularly well constructed.

It covers all the usual areas — the Basic commands, using sound, flow-charts, bug finding, different screen modes, etc, but takes more time to explain itself and lets you test that you really do understand what's been said to a greater degree than most other such books I've seen.

Book *Easy Programming for the Atari Micros*
Price *£6.95*
Micro *Atari*
Supplier *Shiva*
The Hawthorns
64 Welsh Row
Nantwich
Cheshire
CW5 5ES

Conceptual

Games Programming sounds like another one of those awful books of listings I've moaned about before, but mercifully it isn't.

What we have here is a serious book about writing games. It looks and reads like an academic tome. *Games Programming* discusses the concepts behind games design rather than how to create *Space Invaders*. For example, it deals with things like the kinds of maths useful in wargaming.

The book varies between strictly programming information and more abstract considerations on how the real world can be modelled by a computer. It's rather earnest difficult stuff but fascinating as well.

Book *Games Programming*
Price *£7.50*
Micro *General*
Supplier *Cambridge University Press*
The Edinburgh Building
Shaftesbury Road
Cambridge
CB2 2RU

Ozone layer

Tim Hartnell, author of many good computer books and editor of many others has recently issued a book called *30 Dynamic Games for the Aquarius*. I blame aerosols eating away the ozone layer myself.

Book *30 Dynamic Games for the Aquarius*
Price *£2.90*
Micro *Aquarius*
Supplier *Interface Publications*
9-11 Kensington High St
London W8 5NP

This Week

Program	Type	Micro	Price	Supplier
Crawler	Arc	BBC	7.75	Walford
Drilla Killa	Arc	BBC	£6.90	Vampyre
Dune Rider	Arc	BBC	£7.95	Micro Power
Paranoid Pete	Arc	BBC	£5.60	Ubik
Pengo	Arc	BBC	£7.75	Walford
Bensoft Pools Predict	Ut	BBC	£7.90	Bensoft
Connect 4	S	Commodore 64	£1.99	Atlantis
Scrabble	S	Commodore 64	£12.95	Leisure Genius
Citadel of Chaos	Ad	Commodore 64	£5.90	Penguin
Forest of Doom	Ad	Commodore 64	£5.90	Penguin
Daley Thompson's Decathlon	S	Commodore 64	£7.90	Ocean
Strip Poker	S	Commodore 64	£8.95	US Gold
Turbo Saver	UT	Commodore 64	£7.00	Arrow
Death Valley	Ad	Dragon	£6.50	Micro Deal
Magic Midnight	Ad	Dragon	£7.50	Magic Midnight
Rhorn of the Ring	Ad	Dragon	£6.95	Wintersoft
Zak Attack	Arc	Dragon	£6.95	Cable
Rat Race	S	Dragon	£7.50	Magic Midnight
Ghouls	Arc	Electron	£7.95	Micro Power
Felix in the Factory	Arc	Memotech	£6.95	Micro Power
Cashbook	Ut	MSX	£14.95	Micro Aid
Memo Calc	Ut	MSX	£14.95	Micro Aid
Payroll	UT	MSX	£29.95	Micro Aid
Prisoner of Village	Ad	Spectrum	£5.50	Spoof
The Lost Orb	Ad	Spectrum	£6.50	K W Computing
Paranoid Pete	Arc	Spectrum	£5.60	Ubik
Diseases of the Heart	Ed	Spectrum	£6.95	Medidata
Master Mariner	S	Spectrum	£1.99	Atlantis
Vagan Attak	S	Spectrum	£1.99	Atlantis
Coursewinner	Ut	Spectrum	£12.50	Selec
Poolswinner	Ut	Spectrum	£15.00	Selec
Space Art	Ut	Spectrum	£2.95	Eclipse
The Unitrust Program	Ut	Spectrum	£12.00	Michael Stafford
Snoopy's Christmas	Arc	TI99 4A	£6.50	Gameware

Key Ad — adventure/Arc — arcade/Ed — educational/
S — strategy simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD



Flatland

It's only logical when you think about it. We are three-dimensional people, but our computer screens present two-dimensional pictures of a 2D world. So perhaps it's a nifty idea to study the way a 2D world would really work.

Oddly enough, there's quite a stack of literature on the subject, stretching back to the pre-computer age, as long ago as 1884.

That year saw the publication of Edwin Abbott's *Flatland. A Romance of Many Dimensions*, which started the idea of thinking flat. Abbot's *Flatland*, is literally flat: the inhabitants (whose internal structure is wisely not described) are 2D geometrical shapes lying on, or rather in, an infinite flat plane. Because there's no third dimension of "height" a mere line in this plane is an impenetrable barrier to your average Flatlander.

This sounds familiar. Flatland's geometry is more or less that of our old favourite *Pac-Man* — the chief difference being those "tunnels" at each side of the Pac-Man screen, where the flat space of the game sneaks round to join onto itself. A more thorough-going example is the curved space of *Asteroids*, which in cosmologists jargon is "finite but un-bounded" since whenever you reach the "edge" you reappear on the other side.

Two authors wrote sort-of-sequels to *Flatland*, introducing the curved-space idea in different ways. Dionys Burger's Sphereland (1965) converts Flatland into the surface (only) of a sphere, so you can travel forever on the "plane" without reaching an edge. The idea of the book is to push Einstein's view of *our* universe as curving through 4D space, so that to travel far enough out from Earth will take you clear round the curve of the universe and back.

The other view of 2D life comes from Charles Hinton's *An Episode of Flatland* (1907). Instead of making Flatland a 'map' viewed from above, as in *Pac-Man*, Hinton saw it from the side with a definite 'up' and 'down' (but, to compensate, no north or south). Just as in *Space Invaders* Hinton's Flatlanders stand upright on the rim of the circle, their planet, towards whose centre they're pulled by gravity. 2D gravity, of course, obeys an inverse linear instead of an inverse-square law. The flat, circular planet orbits a flat, circular sun in a flat universe.

The latest work on the subject is *The Planiverse* by A.K.Dewdney, a 1984 paperback (Picador £2.95) which tackles a 2D world in mind-boggling depth.

In 2D, a piece of string is a versatile tool. It can't *be* knotted without an extra dimension, but the Flatlanders (Dewdney even gives them a plausible biology!) can walk over deep gorges on it, in effortless tightrope fashion, can hold it stretched overhead as a perfect umbrella, can carry water in a loop of it, or can loop the string around an area of light gas to create an instant, personal airship. There's no way to fall off a tightrope since there is no "sideways".

The book goes further. Conventional wheels don't work (the axle has to be central, and therefore inaccessible because it's totally enclosed by the wheel's rim), but rollers do. You can't nail two planks together: when the nail goes through the top one ... is to split it completely in two. Rainfa... causes flash floods because the soil's impervious. And so on.

Very soon I expect to see a computer game simulating the weird possibilities and restrictions of a Flatland. *Go North*, you forgetfully type, and the computer replies. *North is an abstract metaphysical concept without real meaning in this universe, square.*

It could leave you feeling pretty flat.

David Langford

Pyramid building

Puzzle No 121

When Wolfgang the woodcutter had a very large cube of wood surplus to requirements, he cut it into a number of identical smaller toy blocks for his young offspring. He was surprised to find, when at last he finished, that he had made exactly the right number of blocks for his child to build a square-based pyramid. He boasted of the fact proudly to the village school teacher that night.

"You say that your son built a square pyramid," queried the teacher, " — the type with a single block on the top tier, a two-by-two arrangement on the second from top tier and so on?"

"That is correct," said Wolfgang.

"And each of the blocks is exactly cubic as was the original piece of wood?" Wolfgang nodded.

"It's impossible!" replied the schoolteacher.

They rushed off to the woodcutter's house to investigate the matter and the solution was quickly found. In building the huge pyramid just one of the small blocks had rolled into a corner where it had lain undetected.

How many blocks were there in all?

Solution

The program places consecutive integers into a string and scans them for their individual digits. Each element of the dimensioned array *D*(10) is incremented by one to keep a tally of the total number of times each digit occurs (the zeros go into *D*(10)).

When *D*(1) is equal to *D*(2)+*D*(3) the results are printed.

```
10 DIM D (10) 20 LET N = 1 30 LET N$ = STR$ (N)
40 FOR M = 2 TO LEN (N$) 50 LET T = VAL
(MID$(N$,M,1)) 60 IF T = 0 THEN LET T = 10 70
LET D(T) = D(T) + 1 80 NEXT M 90 IF D(1) = D(2) + D(3)
THEN PRINT N 100 LET N = N + 1 110 GOTO 30
```

Note that the string *N$* is scanned beginning at position 2 in lines 40-80 as many micros reserve the first character for the positive or negative sign. This results in a number of possibilities, but the only *odd* one is when *N* = 115. (The next highest odd result (*N* = 1499) would also be too large for a 'slim' volume.

Winner of Puzzle No 116

The winner is: Roland Langridge, Regent Street, Clifton, Bristol, who receives £10.

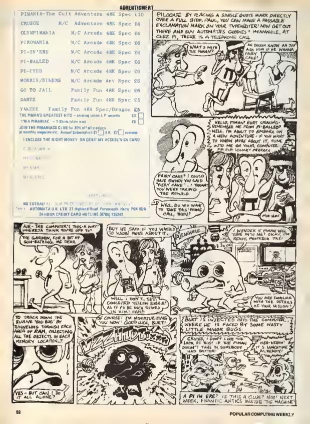
Rules

If the puzzle can be sensibly solved using a computer then the winner will have included a listing of the program used to find the correct answer. The closing date for entries to Puzzle No 121 is September 6.

The Hackers






ADVERTISMENT
PIMANIA-The Cult Adventure 48K Spec £10
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I ENCLOSE THE RIGHT MONEY OR DEBIT MY ACCESS/VISA CARD
AUTOMATA U.K. LTD 27 Highland Road Portsmouth Hants PO4 9DA
24-HOUR CREDIT CARD HOTLINE (0705) 735242
PILOGUE BY PLACING A SINGLE QUOTE MARK DIRECTLY OVER A FULL STOP, PAUL, YOU CAN MAKE A PASSABLE EXCLAMATION MARK ON YOUR TYPEWRITER' NOW GET OUT THERE AND BUY AUTOMATA'S GOODIES" MEANWHILE, AT CHEZ PI, THERE IS A TELEPHONE CALL
WHAT'S WITH THE PIMAN?
AH DOUGH KNOW AH JUS' ASK HIM IF HE WANNA FAIRY CAKE!
HELLO, PIMAN! BURT SPEAKING- REMEMBER ME FROM PI-BALLED? WELL, I'M ABOUT TO EMBARK ON A NEW ADVENTURE - IF YOU WANT TO KNOW MORE ABOUT IT, TUNE INTO ME ON YOUR COMPUTER.
FAIRY CAKE? I COULD HAVE SWORN YOU SAID "FIERY CAKE" - I THOUGHT YOU WERE TAKING THE RONALD
WELL, DO YOU WANT TO TAKE THIS 'PHONE CALL, THEN?
MM HM!
AIE - THE COMPUTER'S THIS-A WAY! WHEREJA THINK YOU'RE OFF TO?
THE GARDEN, FOR A BIT OF SUN-BATHING, ME DEAR
BUT HE SAID IF YOU WANTED TO KNOW MORE ABOUT IT.
WELL I DON'T, SEE! CONCEITED YELLOW BUBBLE! AS IF I'D BE INCH RESTED IN HIM! HAH!
MEANWHILE
I WONDER IF PIMAN WILL TUNE INTO ME? OKAY, I'M READY, PROFESSOR JAS!
YOU ARE FAMILIAR WITH THE DETAILS OF YOUR MISSION?
TO TRACK DOWN THE ELUSIVE 'BIG BUG' BY TUNNELING THROUGH EACH AREA OF RAM, COLLECTING ALL THE OBJECTS IN EACH MEMORY LOCATION...?
YES - BUT CAN I DO IT ALL ALONE?
OF COURSE! I'M MINIATURIZING YOU NOW! GOOD LUCK, BURT!
VZZZHIDTTXXTT
BURT IS INJECTED INTO THE COMPUTER, WHERE HE IS FACED BY SOME NASTY LITTLE MINOR BUGS
CRIPES, I DON'T LIKE THE LOOK OF THIS! IF THE PIMAN DOESN'T TUNE IN, SOMEBODY HAD BETTER!
HEH-HEHHH! IT'S LUNCHTIME ALREADY!
A PI IN ERE? IS THIS A CLUE? NOO! NEXT WEEK, FRANTIC ANTICS INSIDE THE MACHINE!